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THE AMERICAN JOURNAL

— OF —

OPHTHALMOLOGY.

VOLUME XV. -- 1898.



DOLF ALT, M.D.,
1898.

ST. LOUIS, MO.



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THE AMERICAN JOURNAL OF
OPHTHALMOLOGY.

VOL. XV.

JANUARY, 1898.

NO. 1.

ORIGINAL ARTICLES.

ON THE HISTOLOGY OF A CASE OF SUDDEN
BLINDNESS CAUSED BY AN INJURY TO
THE SKULL. THE FIRST CASE OF
FRESH CHOROIDAL RUPTURE
HISTOLOGICALLY
EXAMINED.¹

BY ADOLF ALT, M.D., ST. LOUIS, MO.

THE case which I wish shortly to report here may, perhaps, not be unique. Clinically I know it is not. Yet, if any similar case has been microscopically examined and described, I have failed to be able to find it in the literature at my disposal, nor have I in my somewhat extended researches in the field of the histo-pathology of the eye ever met with such histological changes.

The specimen came into my hands without my having seen the case previously. For it and the following clinical history I am indebted to my friend, Dr. Joseph Spiegelhalter, of St. Louis, Mo., who had removed the eyeball. He writes as follows:

¹Read before the Ophthalmic Section of the British Medical Association, held at Montreal, August-September, 1897, and republished with Original Photographs.

"E. B., a lad, aged 18 years, while playing with a revolver in the evening of March 23, 1897, accidentally shot himself in the head. The entrance wound of the bullet was situated in the temporal surface of the frontal bone on the left side, three-quarters of an inch above the zygomatic process and one inch behind the linea semicircularis. The wound canal passed directly forward and a little downward. In its passage the bullet had slightly injured the roof of the orbit, at least on its cerebral surface, and lacerated to some extent the base of the left anterior lobe of the brain.

"I saw the lad about an hour after the accident, when I found him in the hands of two practitioners who had been examining and probing the wound canal, and had removed some brain substance mixed with several small spicules of bone. There had hardly been any hæmorrhage from the wound. The left eyelids were swollen and the eyeball protruding. The patient was in a semi-comatose condition, from which by loud calling he could be aroused sufficiently to answer some simple questions. There was only doubtful perception of light in the eye on the injured side, and touching the eyeball produced no reflex action. The pain caused by the injury seemed to be comparatively trifling.

"I cleaned the wound canal thoroughly, removed what I could find of loose brain substance and bone tissue, and dressed it antiseptically.

"The night following the injury the patient slept fairly well. His pulse and temperature remained normal.

"The next day it was clear that the visual function of the protruding eye was absolutely destroyed. The exophthalmos increased more and more. On March 26, that is, not quite three days after the injury had occurred, the cornea, not being covered by the eyelids, showed signs of decay. I therefore proceeded to remove the eyeball, together with some adherent orbital tissue, Tenon's space having been totally obliterated.

"After the removal of the eyeball I again made a thorough digital examination of the walls and roof of the orbit in order to see whether or not the bullet had perforated the orbit. I could, however, find no opening anywhere.

"I am, therefore, of opinion that the bullet had passed along the cerebral surface of the roof of the orbit, shattering it to some extent, and had entered the frontal sinus near the

crista. It is, no doubt, at present lodged in the sinus frontalis, and causes no apparent inconvenience."

When Dr. Spiegelhalter had reported this case to the Association of German Physicians of St. Louis, Mo., a discussion took place as to the direct cause of the sudden blindness from the brain injury, and as a consequence the specimen preserved in formol solution was given to me for microscopical examination.

I found the eyeball surrounded by a considerable amount of muscular and orbital tissue firmly matted together. Attached to it remained a piece of optic nerve almost one inch in length.

I divided the eye by an equatorial section into an anterior and a posterior half. When the sclerotic was opened a considerable amount of sanguineous fluid came from the vitreous chamber. The remaining vitreous body was adherent to the lower part of the retina. Where this attachment had taken place a fold of retinal tissue was raised to some extent into the vitreous chamber. The fold reached from the optic papilla to the very ora serrata.

When, before embedding, I removed the specimen from the formol solution to the alcohol all the tissues of the eyeball and the surrounding orbital tissue took on a more or less bright red blood color. This, of course, showed that extensive hæmorrhage had taken place into the orbit, penetrating into all the tissues of the eyeball and into the inter-vaginal space of the optic nerve. This was macroscopicall visible and so extensive must the hæmorrhage have been, that it alone would have sufficed to explain both the exophthalmos and the sudden blindness, had there been no other pathological changes within the eye.

The optic nerve had evidently not been severed by the bullet, nor do I think that, from the description of Dr. Spiegelhalter, the bullet took a course in which it met with this nerve.

No ophthalmoscopic examination having been made, the clinical features, pointing in themselves to an enormous hæmorrhage into the orbital tissue, were sufficient to explain both blindness and exophthalmos. Whether the blindness was absolute and would have been lasting, or whether the subsequent absorption of the extravasation would have led to a partial return of vision it is impossible to say.

In general, all the tissues when microscopically examined were filled with red and white blood cells.

I found the most interesting changes in the choroid and retina, and especially at the place where the raised fold of retinal tissue protruded into the vitreous chamber.

As a result of the *contre-coup* these tissues show a large number of ruptures differing as to their extent in surface as well as depth. It is particularly to these ruptures that I want to draw your attention, and more especially to the one which seems to be the type of what has clinically been termed an isolated choroidal rupture, although, as far as I know, it has never yet been examined microscopically. The other and manifold changes in the structure of the retina and choroid, which are remarkable since only such a short time (barely three days) had elapsed between the occurrence of the injury and the enucleation of the eyeball, I do not wish to describe here.

The simplest form of rupture of the choroid which I found produced by the injury, was a tear through the lamina vitrea and pigment epithelium. This was followed, or perhaps preceded, by a hæmorrhage which lifts up a small fold of retina. The blood is mixed with a large number of cells containing pigment and free pigment granules, evidently derived from the cells of the pigment epithelium in the neighborhood of the rupture. The retina, excepting its bacillary layer, is comparatively unaltered.

The larger the tear, and the more the blood extravasated under the retina, the greater is the alteration by the pressure in the structure of the retina, until, in some places, this can hardly be recognized as such. In spite of such considerable alteration in structure the retinal blood vessels may remain apparently unaltered, at least they are so in a number of places in this case. They are, in some of these, very hyperæmic, especially the veins, in others they are empty; and sometimes they show signs of a beginning endovasculitis.

In some parts two or three such small ruptures of the inner surface of the choroid are situated close beside each other. Near one there seem to be evidences of a new formation of blood vessels, which grow from the choroid into the extravasated blood, by which the retina is pressed inward toward the vitreous. (See Figs. 1 and 2).

In one place a rupture has taken place through the whole thickness of the choroid. The gap resulting in this manner is

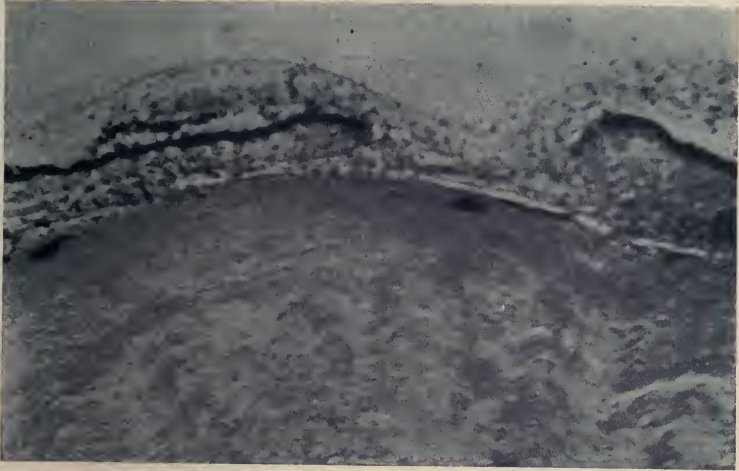


FIG. 1.

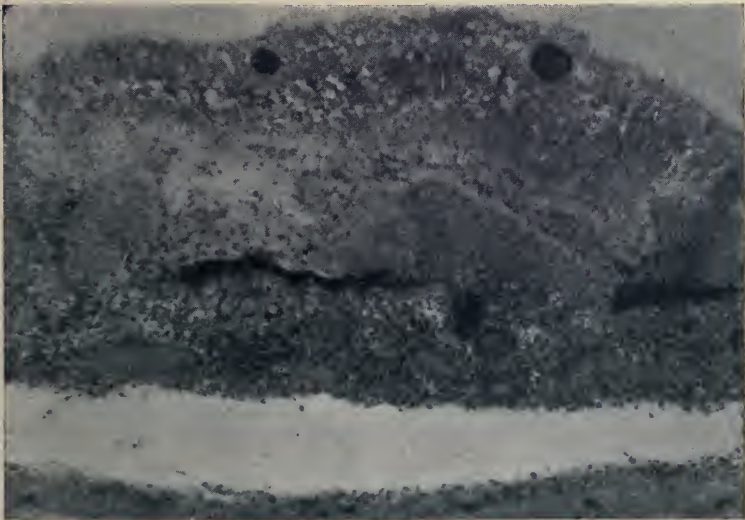


FIG. 2.

filled and covered over by retinal tissue. At the edge of this

tear the retraction of the choroidal wound lips is plainly shown by the wavy line formed by the relaxed lamina vitrea. The pigment epithelium seems to be proliferating, and new and unpigmented cells are situated in the folds of the lamina vitrea. The retinal tissue covering the gap has lost all its characteristic features. It appears as a loose, more or less laminated connective tissue, in which are embedded a number of round cells, perhaps remnants of the retinal cells, and cells carrying pigment derived either from the choroidal cells or from those of the pigment epithelium layer. (See Fig 3).

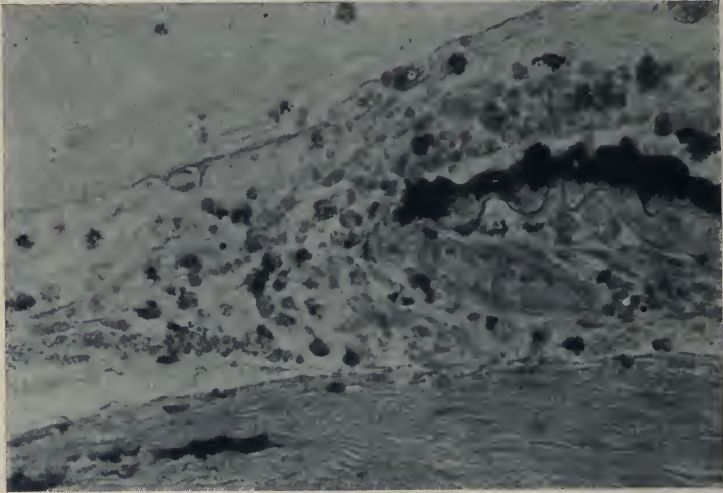


FIG. 3.

This, I think, is the histological appearance of that condition which has clinically been termed an isolated rupture of the choroid.

Farther forward towards, and extending into, the ora serrata there is a very large gap in the whole thickness of the choroid. Here the sudden gush of blood from the torn choroidal blood vessels has torn loose a large flap of the retina and folded it backwards upon itself. The vitreous has filled the gap in the choroid and has assumed a markedly fibrillar structure. The detached retina is greatly broken up in its outer layers, although its blood vessels are still well filled with blood, at least here and there.

All the ruptures which I have thus far mentioned concerned chiefly and primarily the choroid, and seem to have affected the retina secondarily only. There are, however, also a number of places in which the *contre-coup* has caused a rupture of the retina alone, and in which the choroid has remained perfectly intact. These ruptures, as far as I have observed them, seem to have penetrated the whole thickness of the retina. The wound lips of this membrane are retracted, and the retinal elements in the neighborhood of the rupture are considerably altered by degenerative changes. The gap, resulting from the retraction of the wound lips, is filled with a small

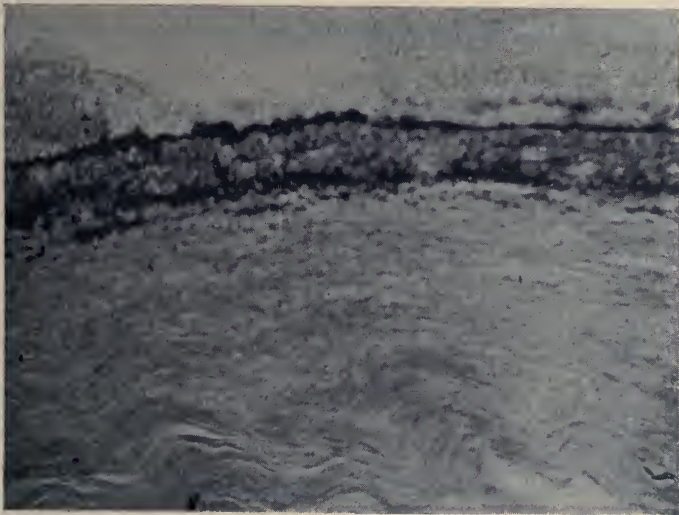


FIG. 4.

amount of very loose fibrillar tissue of doubtful origin, embedded in which is a number of cells. Some of these are unpigmented round cells, and seem to be, perhaps, remnants of the retinal cells; others are filled with pigment granules, and are probably derived from the pigmented epithelial cells. Whether this interposed tissue is derived from the adjacent vitreous body, or from the retina, from both these sources, it is impossible to tell. (See Fig. 4).

I have brought a photograph here, which is taken from another eye, which was destroyed by a bullet which struck the

cornea obliquely. Besides other changes not concerning us just now, the *contre-coup* here led to a large rupture in the choroid, causing an immense hæmorrhage. The retina in turn was altered in a peculiar manner by this hæmorrhage, as, besides being detached *in toto*, its outer layers (in some parts the bacillary layer, in others the bacillary and outer granular layers together) were torn loose from the remainder of this membrane. It would take too long to detail to you here the changes which have taken place in other membranes of the interesting eyeball which is the subject of this report.

Since this paper was written, the last number of *v. Graefe's Archives* (XLIV., 1) has reached me, containing an article by S. Ginsberg on the microscopical conditions found in an eye which had undergone an isolated choroidal rupture eleven years prior to its enucleation. This rupture, having so long been cicatrized, presents totally different features from the case of recent rupture I have just reported. Ginsberg has, however, also carefully gone over the literature of the subject, and, like myself, he could not find a single case of recent choroidal rupture which had been microscopically examined and placed on record.

With this testimony added I suppose that the case I have reported to you is really the first case of a recent choroidal rupture which has been microscopically examined.

THE TECHNIQUE OF NEEDLE OPERATIONS UPON THE LENS AND UPON THE CAPSULE.¹

BY EDWARD JACKSON, A.M., M.D., PHILADELPHIA, PA.,

PROFESSOR OF DISEASES OF THE EYE IN THE PHILADELPHIA POLYCLINIC,—SURGEON
TO WILLS EYE HOSPITAL.

CERTAIN points with reference to needle operations upon the crystalline lens, and upon the capsule after the removal of the lens, are not sufficiently discussed in the recent text-books or elsewhere in ophthalmic literature.

The first point is that it is sometimes very important to clearly differentiate the operation of discission to produce absorption of the crystalline lens from the division of a membrane remaining after the lens has been removed. This distinction is of especial importance when the discission is done to ripen an immature cataract or to prepare the clear lens for removal in high myopia.

After discission the liability to pericorneal redness, photophobia and pain is directly increased in proportion to the amount of unaltered or slightly altered lens substance lying free in the anterior chamber. At least, this is true of the majority of cases.

The object to be aimed at in these operations is, therefore, the greatest breaking up of the lens with the least escape of lens substance into the anterior chamber. This is to be attained by making the incision in the capsule small, while allowing free movement of the blade within the lens substance. This is only possible when we can bring the opening in the capsule close to the opening in the cornea. The corneal wound must be in front of the pupil, and the aqueous humor

¹ Read before the Section of Ophthalmology of the College of Physicians of Philadelphia, November, 1897.

must be allowed to escape through it before proceeding to stir up the lens substance.

In contrast with the above is the need for overcoming the elasticity of the membrane and making as large an incision as possible in the division of the thickened capsule after lens extraction. The object here is accomplished by placing the corneal wound which serves as a fulcrum, as far from the incision in the capsule as possible, and preserving the distance between them by retaining all the aqueous humor throughout the operation by using a needle with a shank large enough to fill the corneal incision.

A second point is that where there is to be much sweeping of the knife-needle, as for the division of a tough membrane it is best to make the incision not through the clear cornea as commonly taught, but through the overlapping vascular tissue of the limbus. By doing this we lessen the danger of infection as well as get a greater sweep of the blade. We know that injured corneal tissue is replaced by sound tissue rather slowly, so that considerable time may elapse after a needle operation before the eye is safe from infection if the tissue about the corneal incision has been bruised in the operation. If, however, the knife is entered through the overlapping conjunctiva and sclera of the limbus the wound will be certainly sealed from external infection within a few hours, and the risks which have caused a needle operation to be regarded as more dangerous than a lens extraction will be almost entirely avoided.

The plan of entering the needle thus peripherally I have employed, wherever practicable, for more than ten years, and have never seen serious disturbance of the eye follow it. Its weak point is, that the needle lying nearly in the plane of the membrane to be divided, it is more difficult to make the division of the membrane exactly at a given point. A slight deviation of the blade makes a considerable difference in the location of the incision. This, however, is a minor consideration when weighed against safety and the ability to divide more certainly and freely tough and elastic membranes that a peripheral entrance gives.

A third point is that in dividing capsular remains after cataract extraction we should, as far as possible, plan our incisions so as to cut through the bases of any posterior synechia

that may be present. Usually it would complicate the operation and might defeat its purpose of giving a clear pupil to attempt exactly to divide each synechia. But it often answers the same purpose, of freeing the iris from irritating drag upon it, if you make the incision pass close to the base of the synechia and divide the membrane across the direction of tension. In this locality, also, the membrane is usually easier to divide, less apt to give before the cutting edge. I have repeatedly seen eyes that remained irritable for many weeks with isolated synechia upon which the iris dragged become perfectly quiet immediately after the freeing of such synechia by division of the capsule close to it.

A fourth point is that in dividing a thickened capsule unless the pupil be quite large it is not best to attempt a crucial incision. After the first incision has been made the membrane becomes so relaxed that it is impossible to cut *from* the original incision. The needle must then be entered at the margin of the pupil and made to cut *toward* that incision. For a crucial incision this necessitates the introduction of the needle on both sides. One is more likely to be successful in making a T-shaped incision.

One plan is to make an incision in the margin of the pupil towards the point of corneal entrance by the first sweep of the knife and then to penetrate the membrane at the farther margin of the pupil, and by a second sweep to cut towards the first incision. Another plan is to make the T-shaped incision with both of its lines oblique to the direction of the knife. A successful T-shaped incision will give sufficient gaping in any membrane upon which it is proper to attempt a single needle operation.

A CONTRIBUTION TO THE GLAUCOMA QUESTION.

BY N. J. WEILL, M.D.,

FROM THE EYE CLINIC OF THE UNIVERSITY OF ZUERICH, SWITZERLAND.

WITH this publication I simply desire to offer a few notes or rather an imperfect analysis on a very important subject with which we are daily brought into the most intimate relation, while as yet we are in a most unsatisfactory position to favorably combat it. At a first, yes, perhaps after a repeated consideration of this article, it is quite probable that many will discard these remarks, as they are scarcely consistent with former teachings and are perhaps really impossible. In some respects I am in perfect accord with these men of experience, yet do not most curious disclosures sometimes rapidly alter our opinions? Theories, which our ancestors regarded as unconvincing and absolutely impossible, we now readily accept and look upon as expressly adapted for this or that which occurs to-day. The same may be the fate of the following hypothesis, if those, who are in a position to prove its correctness, fail to respond.

If I had been able to find, by experiment, the needed support to my theory, this particular manuscript should have been given to the publishers some five months ago. According to Mauthner, it is but a loss of time to attempt to set up glaucoma in the eyes of animals, nevertheless in the past eleven months I have endeavored, in various ways, to arouse glaucoma in the rabbits' eye (hypermetropic), but to this day I have been unsuccessful; among others I tried was the method of Knies, but with absolutely negative results.

Thus the following remarks, being solely theoretical, would have been withheld for some time yet; but as Abadie, in the *Ophthalmologische Klinik*, No. 1, has most recently published an article, concerning the course and action of the sympathetic fibers in glaucoma, they may not be too untimely.

It would not be perfectly just to claim that all portions of this theory are true, but I do not hesitate to prophesy, that its consequent operation will eventually fill a long needed want in ophthalmology. That its application will be met by innumerable corrections is foreseen, but is unavoidable.

Before writing this article the works of Adamük, Wegner, v. Hippel, Grünhagen, Mauthner, Donders, Ad. Weber, H. Schmidt, Leber, Brailey, von Stellwag, Cusco, E. v. Jäger, Schnabel, Sattler, Fuchs, Hancock, Fick, Knies, Michel, Langendorff, Braunstein, Dogiel, Stiel, Mulert, and others, on glaucoma, or on the sympathetic nerve, were duly considered. Fuchs on "Iriskrypten," and Greeff's "Befund am Corpus Ciliare nach Punction der vorderen Kammer," were also referred to.

As a result of irritation of the proximal end of the unilaterally severed cervical sympathetic nerve Hermann, in his "Handbuch," Vol. IV., p. 415, presents the following summing up: "In the proximal region, supplied by this cut and stimulated nerve, the arteries, the capillaries and the venous roots leading from the latter are seen to have become paler (*i. e.*, they are contracted) in contradistinction to the venous trunks which remain well filled (*i. e.*, dilated to the normal limit). Further, the very important deduction from the experiments of Schiff, Bensen, Adamük, etc., is the decided *increase* in the blood pressure," and upon this do we here immediately want to lay especial stress.

Besides controlling the constriction of the blood vessels of the orbit, the sympathetic nerve is regarded, I believe, quite generally, as governing the action of the dilator of the pupil, an action of much consequence in glaucoma. It would be absolutely wrong, to suppose, that the pupillary dilatation in a bulbus with, for example, T + 1 or + 2, be solely dependent upon sympathetic irritation, here no doubt would compression of fibers of the oculo-motorius also play a part, and this may account for the irregularity of the pupil in some cases; yet this latter condition may be simply due to the more conspicuous state of a normally, irregularly round or oval pupil when it is dilated.

The foundation of this theory is then an irritation of the sympathetic nerve, but the exact cause of the latter can not be presented until this nerve has been histologically studied, par-

ticularly in its relation to glaucoma. Some might propose as the cause of glaucoma the digestive system, others the nervous, and still others the circulatory system, but it is more advisable to reserve these opinions until the macroscopical and microscopical examinations from this standpoint have been completed, at least for a number of years. Subjects of glaucoma are daily dying, thus material for such examinations will not be wanting.

If we regard such an irritation of the sympathetic as existing in fact, must not necessarily a transudation result from the blood vessels, whose contents are subjected to an increased pressure, which, as well as the caliber of these vessels, varies directly with the character of the irritation?

The cases of unilateral sympathetic paresis or even paralysis are by no means rare, but an ophthalmological difference in the caliber of the blood vessels of the fundi is not laid down in a single record. From this we see that the paralysis of the sympathetic nerve, although it is the vaso-constrictor, does not influence the size of the blood vessels of the fundus. Then, for example, given an unilateral sympathetic irritation, can we, from the foregoing, expect constriction of the blood vessels of the fundus?

It is further quite probable, that the stronger the irritation the greater are the destructive characteristics of the transudation. Here, both the quality and quantity of such transudations concern us. Those portions of the bulbus must transude most whose vascular supply is greatest, providing all parts are equally subjected to a given sympathetic irritation; so, here, too, will the destruction be most marked when an impairment presents itself to the exit of the excretion from the bulbus.

It will be remembered, that the choroidal blood vessels around the disc anastomose with the blood vessels supplying the optic nerve, and it is this union which plays an important rôle in the formation of the glaucomatous halo. That most of the blood coming from the choroid coat, as well as the greater part of that from the ciliary body, leaves the bulbus through the venæ vorticosæ, must not be forgotten. The position of these veins is also of moment.

The iris, when it is in a state of contraction, necessarily contains less blood. The greater the contraction, the smaller do the crypts of Fuchs become. These crypts should act as

exits for aqueous humor. Where the bulbus capsule is perforated by the optic nerve, the venæ vorticosæ, etc., it is weakest, and therefore in these places it must naturally first yield to an increased intraocular tension.

It is quite manifest, that the central artery, perforating a membrane like the lamina cribrosa, in order to enter a bulbus which is under an abnormally high tension must pulsate when it is itself subjected to a sympathetic irritation, resulting in vaso-constriction and elevated blood pressure. The central venous current, also, where it leaves the bulbus, is exposed to an obstruction at this same place and must increase the caliber of its vessels.

The curvature of the anterior surface of the lens in glaucoma is positively of paramount importance; in the acute glaucoma, when œdema of the lens exists, this is of still greater consequence than in the chronic forms.

Fuchs, in the fifth edition of his text-book, page 292, says: "Every increase or decrease of the pressure in the blood vessels of the eye must produce a corresponding change in the intraocular tension." This is not manifest under normal conditions as the exits for the fluids are sufficiently capable of compensating action, but let these changes be associated with certain pathological conditions and the fact will be sooner or later disclosed.

All changes seen in glaucoma in the blood vessel walls, which could possibly aid in the production of this disease, are probably as a rule only secondary ones and brought about by the primary cause—the sympathetic irritation and its train of symptoms.

In inflammatory glaucoma (acute or chronic) the contents of the anterior chamber have been found to be more coagulable and richer in albumen than in the normal eye; whether these characteristics be possessed by the aqueous humor in the chronic, simple form, has not as yet been determined. Yet, this is to be expected, if all forms of glaucoma result from the same cause, and this is what we claim.

We allow the aqueous humor to escape by operative interference in order to assist in clearing up vitreous opacities, and often succeed in this. The fact that the anterior chamber, when punctured post-mortem, may become restored led Deutschmann to believe, that such a fluid could only come

from the vitreous chamber. We may then expect, that the exits in the disc around the central blood vessels of the retina can give passage to a like fluid, as that which escapes through the angle of the anterior chamber, *i. e.*, the meshes of the pectinate ligament and the canal of Schlemm. Mauthner, in his valuable work on "Glaucoma," page 142, tells us that the aqueous humor is in part an unused portion of the fluid supplying the vitreous and lens with nutriment.

Whether the one or the other form of the now generally adopted classification of glaucoma results in a given time, depends, to a certain degree, upon the anatomical construction of the eye. The state of the anterior chamber, whether it is more or less shallow, seems to me to depend on the same cause, or, to be more definite, on the state of the zonule of Zinn. It is known, that in the myopic eye the zonule of Zinn is weaker, less developed, than in the hypermetropic or emmetropic eye on account of its much more limited action. Its proportions vary exactly as does the ciliary muscle in these eyes of different length and breadth. Thus in the hypermetropic and emmetropic eye its interspaces must be smaller and less permeable and consequently more easily obstructed than in the myopic eye when under the same conditions (*i. e.*, irritation). This condition of the zonule of Zinn tends to govern the depth of the anterior chamber in glaucoma and our opinion is that the zonule of Zinn is most impervious when it is relaxed. The time of a partial or complete obstruction of the angle of the anterior chamber must also come into consideration.

To explain the excavation of the papilla in an eye with normal tension, lacking a history of inflammatory attacks, we have chosen the following procedure:

It is that part of the disc which is pierced by the central vessels that concerns us mainly, because it is here that an exit must exist for lymph circulating in the vitreous space. Although this passage is not as plainly outlined as those in the periphery of the anterior chamber, there is no doubt as to its existence. In microscopically examining a bulbus of a rabbit employed in repeating the experiments of Knies (injecting ung. hydrarg. ciner. in ol. olivar. et ol. turpent. into the vitreous chamber to set up glaucoma), I chanced upon collections of mercury about the central blood vessels of the optic nerve

also within the optic sheaths and just exterior to the sclera immediately surrounding the posterior pole of the eye. Let us suppose, then, that as the outcome of the sympathetic irritation we have a fluid altered in quality and slightly increased in quantity, circulating in the vitreous space and seeking an exit through the papillary lymph orifices. This alteration may be very slight and yet it may injure the capacity of these excretory channels, in that it gradually leads to a diminution in their caliber. The central blood vessels of the disc (and any others here) are not exempt from this sympathetic irritation, so they also aid in obstructing these channels. The transudation from the blood vessels which are in immediate contact with the lamina cribrosa as also the peculiar mode of excavating the disc, presently to be outlined, aid together in explaining those connective tissue changes which Brailey has termed characteristic of early glaucoma. The excavation is then the result of this altered fluid, following its normal course toward the center of the disc, where it is now met by an obstacle. It is this current which gradually exerts its influence principally upon the center of the disc containing such extremely delicate nervous elements. As it is exactly these fibers that supply the extreme periphery of the retina it is in this part that an early disturbance in function must occur. Through the force of this very current alone this excavation of the disc must become deeper and broader since it pushes this partial obstruction before it. Under these conditions the nutrition of the disc must become injured and its resistance become more and more lessened.

The retinal rods and cones would not at once materially suffer from this fluid which results from the sympathetic irritation. When the exits for its excretion, however, have become too defective then they may be destroyed, not only by the mere presence of the fluid, but also by the consecutive increase found accompanying an increased intraocular tension. If the anterior passages for this lymph into the anterior chamber and its exits from the latter are sufficiently wide for all demands no marked or even diagnosticable increase in intraocular pressure results. The excavation must therefore be due to an altered lymph with obstructing properties which circulates in the vitreous space and acts upon the excretory lymph channels of the disc, not only by blockading them, but also by the very

force of its stream. The destruction is certainly more rapid in comparison with this slow form, just pictured, when it is assisted by a decided increase in pressure in the vitreous chamber, as it must result, when all the exits have become insufficient, but principally those in the angle of the anterior chamber.

The question might here arise, why, if the disc is excavated, are the lymph exits here not larger? This can not be, as the obstruction in these channels by the current and the following atrophy of nervous elements is slowly pressed backwards, probably as far as the exit of these spaces into apertures of similar function within the sheath of the optic nerve. Here this partial obstruction may stop, or it may undergo a connective tissue change, becoming part of the sheath of the atrophied nervehead and thus it leads to total destruction.

In the same manner in which the destruction of the nerve fibers of the disc took place must the structures which form the angle of the anterior chamber suffer, the anterior exit for this lymph, which is here termed aqueous humor. The grave changes will present themselves much earlier upon the disc than in the angle of the anterior chamber by reason of the tissue involved, nervous tissue being much more vulnerable than elastic (ligamentum pectinatum) or connective tissue. The function and construction of the part (shape and relations) must also be considered. Any tissue bathed for a lengthy period in such a fluid as we have spoken of must in time have its nutrition disturbed and its resistance diminished. The elasticity of the fibers of the ligamentum pectinatum being diminished, must not its meshes become less pervious to this altered humor aqueous and thus become insufficient to satisfy the needs?

When, during the formation of this excavation as just delineated, the *main* exits in the anterior chamber or elsewhere become too deficient, the tension begins to increase,—glaucoma simplex with elevated tension; if these exits be far too incapable of doing their duty, visible inflammation results, probably principally from stagnation of the excretion,—glaucoma inflammatorium. Should, in the course of the simple form (with or without plus tension) the irritation for any reason suddenly be increased, an acute exacerbation with apparent inflammation and well elevated tension would be the outcome, providing the excretory passages grew rapidly inadequate. So

too, should all excretory orifices in a *normal* eye become very defective in consequence of a violent sympathetic irritation, is it probable, that an acute glaucoma inflammatorium would result. Bearing in mind, that this sympathetic stimulation may differ in force, we can with facility picture to ourselves the various forms of glaucoma occurring with or without excavation of the disc.

From this hypothesis an operative interference and one most probably curative of glaucoma must be deduced. Such a procedure is easily carried out on the cervical sympathetic nerve. To simply incise that nerve (collectively) is insufficient, since we know how quickly union would again take place, but the excision of a small portion is the proper mode of action.

As said in the introduction, only the most salient points of this theory are here treated of, reserving the remainder as also the significance of many facts mentioned for a more detailed and explicit account which can soon be published should the reception of this article warrant such a proceeding.

FURTHER HISTORY OF A CASE OF SCIRRHOTIC CARCINOMA OF THE ORBITAL LACHRYMAL GLAND OF THE RIGHT EYE.

BY J. ELLIS JENNINGS, M.D., ST. LOUIS, MO.

HISTOLOGICAL EXAMINATION OF SECONDARY ORBITAL GROWTH.

BY ADOLF ALT, M.D., ST. LOUIS, MO.

THE report of this case, with microscopical examination by Dr. Alt appeared in the April, 1897 number of this Journal. The tumor was first noticed in 1885 and grew slowly without causing any pain or inconvenience other than proptosis of the eyeball. In August, 1896, the tumor began to grow more rapidly accompanied by a burning pain in the eye and severe headache and neuralgia. V., O. D.=²/_{LX}. The tumor was excised February 4, 1897, and when the dressings were removed, one week later, the eyeball occupied its normal position in the orbit.

April 7. There was considerable proptosis which, returning at so short a time after the operation, was thought to be due to cicatricial contraction.

June 24. Was called to see the patient on account of severe headache and neuralgic pains which were steadily becoming more severe. The eye is quite prominent and disfiguring and the sight is entirely lost. The growth has evidently returned as a hard mass is felt above the eyeball. Advised evisceration of the whole contents of the right orbit, which was done June 29.

August 10. Saw patient again at her residence. She now complained that the sight of the left eye was rapidly failing. There was evidently some sight left in the eye, as the patient walked into the room and took a chair without assistance. But two days later the patient was brought to the office in a carriage and had to be led into the room. To my surprise I found no perception of light. Pupil fixed and 5 mm. in diameter. There was paralysis of the external rectus muscle. An ophthalmoscopic examination revealed nothing to account for the sudden loss of vision. Arteries and veins somewhat narrow, the disc pale and surrounded by a patch of choroidal atrophy, but the condition of the fundus was about the same as when examined February 15. On removing the bandage the right orbit is felt to be filled with a stony hard growth.

September 20. Patient failing rapidly. For several weeks she has been getting deaf and the family have to shout at her. She is confined to bed and can not stand on account of weakness in her limbs. There is incontinence of urine, and the patient is gradually passing into a state of stupor. Patient died on October 18, 1897.

MICROSCOPICAL EXAMINATION.

The secondary tumor which, together with the eyeball (unfortunately hardened in alcohol), I obtained through the kindness of Dr. N. B. Carson, of this city, consisted of a number of pieces of different sizes.

While in the original tumor the epithelial cell tubes were widely separated by a large quantity of connective tissue, these tubes lie very closely packed in the secondary tumor.

In fact the connective tissue bands are just barely visible. (See Fig. 1).

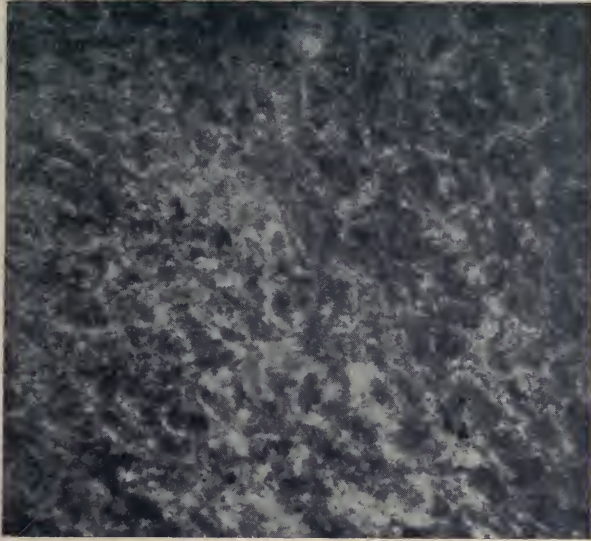


FIG. 1.

In a number of sections the epithelial tubes are so closely packed and arranged in such a way that the picture closely resembles a malignant adenoma. The cells themselves show no retrogressive change, but on the contrary, cells with two nuclei are frequent and karyokinetic figures are not wanting.

We have here then again a case of orbital tumor which, though malignant in its character, grew for twelve years without producing anything more than, if I may say so, a local inconvenience. No sooner, however, was this primary growth removed and, apparently, in a thorough manner, when the tumor elements which must have remained behind, as if enjoying their freedom, spread rapidly and invaded the surrounding orbital tissue and the cerebral cavity. In this manner death resulted within five months from the primary operation and was preceded by a great amount of suffering.

Such cases, it seems to me, should prompt us under similar circumstances, to empty the orbit of its whole contents and thus, perhaps, save the life of the patient, rather than to save

the eye and—as it is evident in such cases—have the patient die as the result of our surgical interference.

This is, of course, not a new observation, yet, I think, it deserves to be dwelled upon.



FIG. 2.

The eyeball, being very badly shrunk by the alcohol, did not yield as nice microscopical specimens as I had hoped it would. Yet, aside from the changes at the posterior pole, accompanying a high degree of myopia I found a number of choroido-retinal atrophic patches corresponding to the changes seen in the fundus ophthalmoscopically by Dr. Jenninge. (See Fig. 2).

NOTE ON PROTARGOL IN OPHTHALMIC PRACTICE.

BY ADOLF ALT, M.D., ST. LOUIS, MO.

SOME two months ago I received the first number of a new journal on "Dermatology," published by Dr. Max Joseph, in Berlin, which contains an article by A. Neisser (of gono-coccus fame), entitled, "The Treatment of Acute Gonorrhœa. A New Silver-Salt, Protargol, etc."

The results which Neisser had reached by using this new silver-salt in treating inflammation of the urethral mucous membrane and particularly the statement, that it produces almost no irritation while being as effective and more so than

silver-nitrate on account of its penetration into the depth of the tissues, prompted me to give protargol a trial in the treatment of all forms of conjunctival inflammation in which I had thus far applied silver-nitrate.

While I am now, after a two months trial, not trying to praise protargol as a panacea for all conjunctival inflammations, I am so impressed and pleased with its beneficial and almost painless action on the conjunctiva, that I want to draw the attention of my confrères to this new silver-salt, protargol, as early as possible.

As far as my experience goes, it acts as well as silver-nitrate, sometimes, indeed, in cases of acute conjunctivitis, I am satisfied it acted quicker, than the older favorite.

I have used it thus far only in a 1 per cent. solution. In this strength it causes no noticeable inconvenience to the patients who, on that account, greatly prefer it to the silver-nitrate.

It would be tiresome to relate individual cases here, it may suffice to repeat, that wherever silver-nitrate is indicated, it is well to give protargol a trial instead, and I have no doubt that in a great many cases, if not in all, the results will be gratifying.

The following information I translate from Neisser's article:

"The new silver-salt, protargol, is prepared by Fr. Bayer & Co., in Elberfeld, Germany.

"Protargol contains 8.3 per cent. of silver (Arg. nitr., 6.35 per cent.; Argonin, 4.2 per cent.; Argentamin, 10 per cent.). It is a chemical combination of silver with a proteine substance, and forms a yellowish fine powder which can be solved easily in cold or hot water by shaking. (Hot water is better—Alt). Heating to a high degree does not render the solution dim.

"Its most important peculiarity, not shared by any other silver-salt, is that from the aqueous solution it is not precipitated by either albumen, diluted chlorate of sodium, diluted muriatic acid, or caustic soda. Ammonium sulfate gives it a darker color, but causes no precipitate. Concentrated muriatic acid produces a precipitate, yet what is precipitated is not silver chloride, but protargol, which, when more water is added, is re-dissolved.

"These characteristics give this salt as great a faculty

of an unlimited penetrating action on the tissues as no other silver-salt enjoys. It is superior to argentamin which, otherwise, is the best silver-salt, in that in solutions of one-fourth, one-half, and one per cent., it causes but an extremely small amount of irritation.

"The experiments concerning the bactericidal action of protargol are as yet unfinished. * * *

* * * "Its action on the mucous membrane may be prolonged without a weakening of its concentration or a diminution of its action on the deep tissues being produced by any chemical changes."

ADDITIONAL PAMPHLETS RECEIVED.

"Treatment of the Infectious Diseases of the Eye by Subconjunctival Injections of Sublimate," by Jehin Prume, M.D.

"Is There Ever a Serous Iritis Without an Involvement of the Ciliary Body or Choroid, or both?" W. Cheatham, M.D.

"Bacteria in the Normal Conjunctiva, Etc. The Staphylococcus Epidermidis Albus, Etc.," by R. L. Randolph, M.D.

"Demonstration of an Easy and Certain Process of Producing Monocular Diplopia by Means of a Prism, Etc." by S. Baudey, M.D.

"Cataract and Its Association with the Gouty and Rheumatic Diathesis, and Their Relation to Diseases of the Eye," by S. D. Risley, M.D.

"A Clinical Study of a Case of Double Chorio-Retinitis in the Macular Region, Following a Flash of Lightning and a Flash from Burning Lycopodium," by Ch. A. Oliver, M.D.

SOCIETY PROCEEDINGS.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

H. R. SWANZY, M.B., F.R.C.S.I., President, in the Chair.

THURSDAY, OCTOBER 21, 1897.

Some Experiments on the Union of Corneal Wounds.—MR. ERNEST CLARKE related experiments consisting of various operations on the cornea of rabbits whereby the anterior chamber was completely emptied of aqueous with the view of ascertaining the time taken by these wounds in uniting sufficiently to allow the anterior chamber to be reformed. Description of the methods adopted in operating and preserving the specimens were given. Two classes of experiments were performed. In the first class the animal was kept under an anæsthetic and killed. The anterior chamber was found to be present in two minutes, and fully re-formed in twenty-five minutes. In the second class the animal was allowed to recover, and, after varying intervals, ranging from half an hour to two hours and a half, again placed under an anæsthetic and killed. The movements of the animal caused delay in the reformation of the anterior chamber. The average time was an hour and a half. Wounds at the upper margin united most rapidly with less scar. Wounds across the center of the cornea and at the lower margin took longer to repair and made a larger scar. The rapidity with which the anterior chamber was re-formed suggested that if, during an operation on the eye where the presence of the aqueous was necessary, this aqueous were accidentally lost, the eye should be bandaged, and the continuance of the operation postponed only for half an hour at the outside instead of postponing it until the next day, as was generally done. The experiments also showed the great influence that rest had on the process of repair, and emphasized the importance of keeping patients absolutely quiet for the first few hours after an eye operation.

THE PRESIDENT thought that the value of these interesting

experiments would have been increased if it could have been determined how soon a wound in the cornea which had closed became impervious to the entrance of infective organisms.

Remarks were made by MESSRS. BATTEN, ARGYLL ROBERTSON, and MARSHALL; and MR. E. CLARKE replied.

Dislocation of Lens; Couching; Recovery.—MR. T. H. BICKERTON related a case of congenitally misplaced lenses. The patient was a male, aged 28 years. He had been shortsighted since infancy; at 14 years of age he had attacks of giddiness, which caused him to fall and injure his forehead. At the age of 19 he began wearing glasses: R.—6.5 D., L.—6 D. He was first seen in December, 1887. At that time the iris was tremulous; the lens was dislocated into the vitreous in each eye: V. R.c. + 10 D.=⁶/_{XI}; L.c. + 10 D.=⁶/_{XXIV}. On reading the refraction was entirely different: J. 1 at 3¹/₂—4 in.; he looked through the displaced lens. In 1893 he suddenly went blind in the left eye, but the vision was restored next morning. He had two more attacks of the same nature after; during the last one eserine was used, and the eye did not recover as it had previously done. When seen after this occurrence in December, 1893, there was pain and congestion, and the clear lens nearly filled the anterior chamber. The unsatisfactory results obtained from extracting such lenses, and the knowledge that these lenses had been tolerated so long in the vitreous suggested to the author the alternative of reposition. On December 30, 1893, this was done; the pupil was dilated, an incision at the margin of the cornea was made with a keratome to evacuate the aqueous, it was attempted to press the lens back through the pupil by the finger applied to the closed lid; this could not be done, and a spatula was introduced into the anterior chamber; the lens then slipped back into the vitreous. Perfect recovery followed, and in June, 1897, three years after, the vision of the eyes was

$$\begin{array}{r} \text{L.c.} + 12 \text{ Ds.} \\ \text{R.c.} + 12 \text{ D, } \frac{6}{5} \text{ ptly, } \frac{\text{L.c.} + 12 \text{ Ds.}}{\text{—}.75 \text{ D. cyl.}} = \frac{6}{5}. \end{array}$$

The interest of the case lay in the fact that blindness followed the use of eserine, which prevented the lens from passing back again into the vitreous, and the fact that the eyes had remained perfectly healthy, although the lenses had been dislocated into the vitreous nearly four years.

Card Specimens.—The following were the card specimens:
MR. ADAMS FROST, "Odell and Porter's Centering Instrument for Ophthalmic Lenses."

MR. ARNOLD LAWSON, "Leuco-Sarcoma of the Choroid."

DR. RAYNER BATTEN, (1) "Foreign Body Found Impacted on Optic Disc After Removal of Traumatic Cataract"; (2) "Pulsating Tumor of Orbit, (? Meningocele)."

DR. J. F. BULLER, "Case of Deficiency of the Choroid."

MR. LANG, "Primary Syphilitic Lesion of Inner Canthus."

G. A. BERRY, F.R.C.S.Edin., Vice-President, in the Chair.

THURSDAY, NOVEMBER 11, 1897.

Heredity and the Development of Myopia.—MR. WRAY began by stating that some observers found a family history in as many as 60 per cent. of their cases of myopia. On the assumption that one-fourth of the hereditary tendencies were from each parent, and one-sixteenth from each grandparent, it was plain that hereditary predisposition would appear more and more in the etiology of myopia. Mr. Wray questioned the expediency of using the term "acquired myopia" lightly as no case could legitimately be called acquired unless ancestral myopia could be disproved, which the author contended was impossible. He next submitted that authorities repudiated the possibility of the transmission of acquired structural peculiarities, and experimental evidence was quoted to the effect that the removal of an eye in rabbits during many successive generations failed to cause the birth of one-eyed offspring. The author conceded the transmissibility of ordinary myopia, and then stated that there was no relation between the sum of the myopia of myopic parents and the amount that would appear in the offspring, and when the highest grades had been found the parental myopia was invariably confined to one parent. Since Fukala's operation had come into vogue, the author had given special care to the investigation of the antecedents of such patients, and found in a considerable number of cases that the child with very high myopia has suffered from protracted infantile marasmus, whilst the brothers and sisters who escaped had not. He further stated that out of 126 cases of myopia over 10 D., he had not found one instance

in which parent and child were both subject to an equal or approximately equal amount. The existence of the highest grade of myopia in one eye only made it exceedingly probable that other influences acted as powerfully as marasmus in the predisposed. Since such grave disproportions never arose in the limbs during their development, it was necessary to consider the difference in their development, and this was to be found in the way in which the vitreous was formed by the passage of mesoblastic elements into the secondary optic vesicle. Mr. Wray suggested the possibility of hypoinclusion being the basis of hypermetropia and excessive inclusion the cause of myopia. He alleged that this theory would explain the variation in the age at which myopia appeared, and the phenomena of stationary and progressive hypermetropia and myopia, as well as numerous other points in the pathology of myopia.

Potassium Permanganate in Ophthalmia.—MR. SYDNEY STEPHENSON communicated particulars of a case of purulent ophthalmia in a baby, where the frequent use of a strong solution of potassium permanganate had given rise to a deposition of manganese dioxide upon the cornea. The mark, which was of coal-black color, disappeared a few days after the use of the solution had been discontinued.

Cataract Extraction.—Surgeon-Captain HERBERT, I.M.S., said that the conditions of operating were unfavorable in India, and he had found it impossible to exclude infection till he employed strong perchloride (1 in 2,300) as a routine antiseptic. The lotion was used freely to the face, lids, and conjunctiva, then cocaine was instilled, the lids being kept closed to prevent the drying of the epithelium, and during the operation the surface of the eyeball was kept moist by the constant dropping of boiled saline solution. Since the adoption of this method he had performed 281 extractions; there had been no suppurations, and no iritis severe enough to affect vision.

A discussion on the value of asepsis as opposed to antiseptics followed in which MESSRS. BERRY, NETTLESHIP, HILL, GRIFFITH, LAWFORD, and CARGILL took part.

Pseudoglioma Due to Choroido-Retinitis Secondary to Men-

ingitis.—MR. L. V. CARGILL described the case of a male infant, with good family history and born at full term, who was perfectly healthy until 3 months old, when it suddenly developed meningitis. A fortnight later the left eye was noticed to be affected with pseudoglioma. Two months afterwards hydrocephalus was developing, and was associated with retraction of the head. Right optic papillitis was discovered, whilst the left membrana tympani was found perforated, there having previously been slight purulent discharges from the left ear. The hydrocephalus increased, the left eye underwent shrinking, whilst the right eye remained unaffected except for atrophy of the optic disc. The child died about ten months after the first onset of illness. A post-mortem examination was not obtained.

MR. TRFACHER COLLINS had observed from pathological examination that these cases were more often retinitis than uveitis. The course of the affection was from the throat by the Eustachean tube, middle ear, meninges, and optic nerve to the eye.

Case of Albuminuric Retinitis.—This paper was read by DR. ARNOLD LAWSON and DR. SUTHERLAND. F. B., aged 12 years, was brought to the hospital on October 29, suffering from headache and vomiting. Examination showed the presence of albumen in the urine and albuminuric retinitis in both eyes. The history of her illness consisted of intermittent attacks of headache during the last ten months. These had hardly become much worse, and were frequently accompanied by vomiting and great prostration. The past history was excellent. She had never had scarlet fever or any cardiac affection. She was always a ravenous eater, and especially fond of meat. The family history was good except for phthisis on the mother's side. The patient was bright and intelligent, and showed no lethargy. There was a diffused heaving impulse over the precordial region. The apex beat was three-quarters of an inch outside the nipple line in the fifth space. The heart's first sound at the apex was rough, and accompanied by a short blowing murmur. The second sound accentuated at the base; the sounds were clear and ringing, the second being accentuated. Arterial pulsation was visible in the large vessels of the neck. The pulse was small, regular, and of high tension,

and there appeared to be some thickening of the vessels walls. The urine was acid, specific gravity 1010, cloudy. Albumen was present in considerable quantities. Microscopically casts, for the most part hyaline, but also a few epithelial or fatty, were found. The fundus in each eye presented the usual changes due to albuminuric retinitis in a typical and advanced form. The case appeared to be one of primary chronic interstitial nephritis occurring at an unusually early age. The symptoms were precisely similar to those met with in adults suffering from this disease. The cause was obscure. Possibly a long course of over-feeding might have so affected the blood as to induce irritative changes in the kidney. No record of any case of albuminuric retinitis occurring at so early an age could be found. One case at 15 years had been recorded by Mr. Benson in 1883. The prognosis as regards duration of life, though very bad, could probably be modified by efficient treatment, and placing the child in the most favorable circumstances as regards home comforts and nursing, etc.

MR. NETTLESHIP called to mind two cases of albuminuric retinitis in children. One was in a boy, the details of whose case he could not recall, but who was under observation for a year; the other was in a little girl, who was said to have recently had Bright's disease. In the latter case there was great pallor of the optic nerve, and old retinal changes with much impairment of vision.

DR. BREWER said that Dr. Bull had published a series of cases, one of which was in a boy aged 5 years. In every case in which a post-mortem examination had been made interstitial and not glomerular nephritis had been found.

MR. LAWFORD had recently seen a boy, aged 17 years, with albuminuric retinitis; he also had chronic interstitial nephritis; he improved materially.

MR. HOLMES SPICER had recently been asked to see a child at the Children's Hospital who had all the signs of acute nephritis; on examining the eyes there were a few small retinal hæmorrhages, but no large masses of exudation.

BOOKS AND PAMPHLETS.

OPTIQUE PHYSIOLOGIQUE (PHYSIOLOGICAL OPTICS). By DR. TSCHERNING. Paris: G. Carré and C. Naud.

This is a most excellent treatise. It is written in a simple and clear style which renders it very perspicuous. Perhaps the most interesting chapter in it is the one on "Accommodation." In this Tscherning gives in detail his explanation of this function which, as our readers well know, differs essentially from those of Helmholtz, Young and others. It vouchsafes to the longitudinal fibers of the ciliary muscle that amount of influence on the act of accommodation which, from their histological importance, one should naturally expect. The illustrations are manifold and to the point. The print is most beautiful.

We hope that an English edition of this work will at an early date be offered to the English-speaking ophthalmological public.

PAMPHLETS.

- "Glaucoma," by Schulek Velmos.
- "Congenital Ptosis," by M. F. Coomes, M.D.
- "Tumors of the Orbit," by W. Cheatham, M.D.
- "Ophthalmia Neonatorum," by L. W. Fox, M.D.
- "Ulcers of the Cornea, Etc.," by L. W. Fox, M.D.
- "Ichthyol in Ophthalmology," by A. Darier, M.D.
- "The Etiology of Strabismus," by E. Landolt, M.D.
- "The Visual Effects of Refractive Error," G. J. Bull, M.D.
- "Statistics of 2641 Cases of Trachoma," by Y. Onisi, M.D.
- "The New Local Anæsthetic, Holocain," H. Derby, M.D.
- "Should Opticians Practice Medicine?" by A. A. Hubbell, M.D.
- "Seventeenth Annual Report of the Newark Eye and Ear Infirmary."
- "The Relation of Eczema to the Mucous Membranes," by Dr. von Schlen.

"Soziodol in the Treatment of Eye Diseases," by B. Byéililowsky, M.D.

"The Treatment of Complicated Ulcers of the Cornea," by C. A. Veasey, M.D.

"A New Method of Mounting Ophthalmic Specimens," by Priestley Smith, M.D.

"Seventh Report of the Eye, Ear, Nose and Throat Hospital of New Orleans, La."

"First Annual Report of the Texas Eye, Ear and Throat Charity Hospital." Austin.

"Refraction of the Eyes of 1,000 School Children, Etc.," by W. M. D'A. Carhart, M.D.

"The Desirability of a Periscopic Quality in Correcting Lenses," by C. M. Culver, M.D.

"Further Experiences with Chronic Diplo-Bacillus Conjunctivitis," by Th. Axenfeld, M.D.

"The Early History of Ophthalmology and Otology in Baltimore," by H. Friedenwald, M.D.

"Gout and Rheumatism as Factors in the Etiology of Glaucoma," by Ch. O. Richey, M.D.

"Intraocular Hæmorrhage During or Shortly After Cataract Extraction," by E. E. Jack, M.D.

"Hysterical Monocular Amblyopia Coexisting with Normal Binocular Vision," by M. Prince, M.D.

"On the Value of the Refraction of the Cornea and Lens of the Newly-Born," by Th. Axenfeld, M.D.

"Lesions of the Retinal Vessels, Retina and Optic Nerve, Associated with Gout," by Ch. S. Bull, M.D.

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THE AMERICAN JOURNAL OF
OPHTHALMOLOGY.

VOL. XV.

FEBRUARY, 1898.

NO. 2.

ORIGINAL ARTICLES.

SYMPATHETIC OPHTHALMIA.—RAPID FAILURE
OF VISION IN INJURED AND SYMPATHIZING
EYE.—IMPROVEMENT AFTER ENUCLEA-
TION, WITH SUBSEQUENT RELAPSE
AND FINAL PARTIAL RESTORA-
TION OF VISION.

BY S. C. AYRES, M.D., CINCINNATI, OHIO.

HISTOLOGICAL EXAMINATION OF THE EYE.

BY ADOLF ALT, M.D., ST. LOUIS, MO.

GLADYS K., aged 7 years, was brought to me for consul-
tation by Dr. J. B. Beckett June 9, 1897. He gave the
following history:

The left eye was injured ten weeks ago by a knife blade. The right eye did not become irritable until three weeks ago, and not markedly so until four or five days ago. She suffered but little pain, complaining principally of the intense photophobia. The left eye was found injected, and there is a scar on the lower and inner quadrant at the sclero-corneal junction indicating the point of penetration. The wound has healed with incarceration of the iris. V. = fingers at 6'. Right eye,

marked photophobia, eyeball injected, iris is nearly normal in appearance, but the pupil is rigid and does not dilate, although strong atropine solution is frequently instilled. She can not read, but counts fingers readily at 20'. Dr. Goode advised immediate enucleation of the injured eye, but to this the mother would not consent until my return, two days later. Atropine and hot fomentations were ordered.

Two days later (9th), I saw her, and found that with the injured eye she could barely see shadows of the hand. There was intense photophobia and lachrymation. The iris was discolored and there was deep scleral injection. With the right eye she could only count fingers at 3'. In two days vision had dropped from counting fingers at 20' to 3' in the sympathizing eye, and in the injured eye from counting fingers at 6' to perceiving shadows of the hand. The iris of the right eye was discolored and rigid, responding very slightly to atropine. The injured eye was enucleated the same day.

Five days later (16th), she could count fingers at 15' and the photophobia was very much better.

June 16. Eye more irritable; pupil not so well dilated; photophobia increased. Can not count fingers. After her return home the eye rapidly improved. The photophobia subsided, and on June 26 Dr. B. wrote me that she could count fingers at 24'.

Two or three days after this test was made, while playing with a friend she received a slight injury to the eye from her hand. It was not severe and did not cause much pain, but there was a rapid failure of vision.

I saw her shortly after the accident and the eye was so irritable that it could with difficulty be tested. The iris was discolored. Later on her mother said she lost her sight so completely that she could not recognize objects around her. This acute condition passed off slowly and she regained some vision.

I saw her a few days ago and she could count fingers at 2'; there was a red reflex from the fundus; the iris was free from irritation; tension was normal, and it seems quite probable that the condition of the eye will gradually improve.

HISTOLOGICAL EXAMINATION OF THE EYE.

Macroscopically the eye, while in formol solution, showed plainly the anterior synechia near the corneo-scleral junction. When æquatorially cut in two halves part of the vitreous body escaped as a thin fluid stained with blood pigment. There was a peripheral detachment of the retina and the papilla appeared swollen. Some of the denser vitreous body adhered to the ciliary body and the posterior surface of the lens, but there was no sign of a cyclitic membrane. When the anterior half of the eyeball was again meridionally cut in two halves, the crystalline lens appeared more spherical than normal. The iris, except at the site of the anterior synechia, was throughout adherent to the anterior lens capsule.



FIG. 1.

The microscopical conditions I studied, as I usually do, through the whole eyeball, cutting it partly into meridional, partly into æquatorial sections. In this manner it is not well possible that any important changes can be overlooked.

Besides a slight infiltration with round cells, the corneal tissue shows nothing abnormal, except at the site of the anterior synechia. Here the iris (see Fig. 1) and part of the ciliary

body was dragged into the corneal wound and has firmly grown together with the adjacent corneal tissue. There was a small prolapse of the iris tissue which is covered over by a thin layer of corneal epithelium. The adjacent corneal tissue contains new-formed blood vessels and the incarcerated iris tissue as well as the neighboring corneal lamellæ are densely infiltrated with round cells. Schlemm's canal in this part is choked with round cells.

The anterior chamber contains an amorphous coagulated exudation in which a large number of round cells and nuclei are embedded. The endothelium of Descemet's membrane is also covered with one or more layers of round cells which, by their presence, have here and there stimulated the endothelial cells to proliferation and the formation of small cellular protuberances into the anterior chamber.

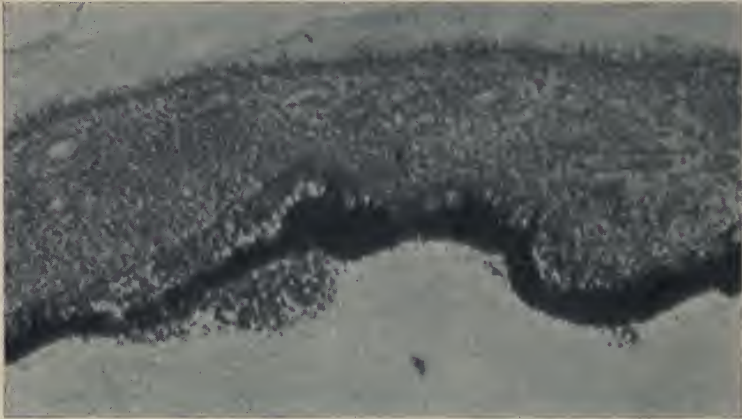


FIG. 2.

The tissue of the iris is throughout filled with round cells. Here and there they form denser tubercle-like accumulations. Its blood vessels are only visible near the anterior surface and those visible show perivasculitis and are empty. The pigment of the iris tissue proper has disappeared. There are bare traces only of the sphincter muscle. The anterior surface of the iris is covered with round cells. The most peculiar change (see Fig. 2) is seen at the posterior surface of the iris. Here the uveal pigment is separated from the iris tissue by a layer of

small cavities divided from each other by pigmented trabeculæ. In these cavities lie some round cells; if, besides, they contained some fluid, during life, it was not coagulated and has escaped. Fig. 3 shows this very peculiar condition under a high power in a somewhat oblique section. The trabeculæ are formed by the stretched and distorted cells of the layer of pigmented spindle cells which by some are considered to be the dilator muscle of the iris. Treacher Collins and some others have described cysts on the posterior surface of the iris due to

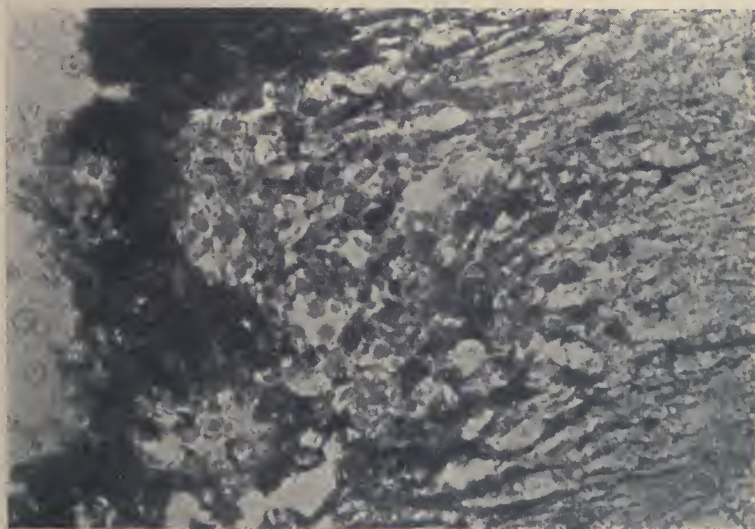


FIG. 3.

a separation of the uveal layer from the rest of the iris by fluid and I have seen similar detachments of this layer. The conditions found in the iris under consideration, which I have seen in one other case, may explain the manner in which these larger cystic cavities may come about through the confluence of the small ones, here depicted. The posterior surface of the iris is glued to the anterior lens capsule in parts by the intervention of a coagulated fibrinous substance filled with round cells. In some parts larger accumulations of round cells directly adhere to the uveal pigment (see Fig. 2).

The ciliary body is in all sections filled with round cells

to such an extent that its muscular elements and blood vessels can barely be recognized. In some places tubercle-like accumulations of round cells are seen. The cells of its retinal layer are not materially altered in the *pars plicata*, but innumerable round cells are seen wandering through them into the interior of the eye. Its processes are thin and atrophic but also contain round cells in great numbers. In the *pars non-plicata* and especially near the ora serrata the retinal layer shows innumerable small detachments, the cells having been lifted off the uveal layer by a fluid which coagulated and is filled here and there with round cells, aided by the shrinking of the vitreous body attached to the fibers of the zonule of Zinn and thus indirectly to the cells of the retinal layer.

The choroid is also everywhere infiltrated with round cells which frequently appear more closely packed in tubercle-like aggregations. Its blood vessels, where visible, contain very little blood.

The fibers of the zonule of Zinn are agglutinated to each other in bundles and tissue of the vitreous body is adherent to them. Numerous round cells adhere to them and lie in the vitreous tissue.

The crystalline lens shows a peculiar condition which I have seen but seldom. Its abnormally spherical shape is due to a withdrawal of the peripheral parts of the lens tissue from the capsule. In this manner a large irregular triangular space between the capsule and the lens tissue is left empty (see Fig. 1). The capsular epithelium reaches to a considerable distance farther back than in the normal condition. This seems to support the theory of O. Becker who thought, in those cases where we find an epithelial layer lining the posterior lens capsule, that in some manner the lens tissue had become loosened from its contact with the posterior lens capsule and thus a space had been formed into which the capsular epithelium could grow. Just such conditions seem to have obtained in the lens under consideration,—at least in the periphery. The lens tissue otherwise shows a number of clefts and here and there drops of Morgagnian fluid, signs of regressive metamorphosis. The anterior capsular epithelium is perfectly regular and shows no sign of proliferation. I do not know, whether a dimness of the lens was perceived during life.

The retina, while at the macroscopical inspection it was

not seen to be detached, except near the ora serrata, is microscopically seen to be everywhere separated from the pigment epithelium by a coagulated exudation of some breadth containing a small number of round cells. The rods and cones are disintegrated anteriorly and perfectly destroyed behind the æquator. The tissue of the retina, and more especially the nerve fiber layer, is filled with round cells. This infiltration becomes denser and denser towards the optic papilla. I could find but few blood vessels in this membrane. Some were empty and apparently unaltered, others showed perivascular and endovascular changes. At and near the papilla optica the membrana limitans interna of the retina is detached to a great extent and pulled into the interior of the eye. No coagulated exudation intervenes.



FIG. 4.

The papilla optica (see Fig. 4) and optic nerve show plainly the changes due to severe optic neuritis. The papilla is very considerably swollen and projects into the interior of the eyeball so that the beginning of the retinal tissue proper is pushed some distance from its normal position. Both optic nerve and papilla are choked with round cells, particularly

along their longitudinal pia mater trabeculæ. As is seen in Fig. 4, the swelling of the papilla is not equal on both sides of the physiological excavation, neither is the thickness of the optic nerve equal on both sides of the central vessels. While this is, of course, in part due to the unequal distribution of the nerve fibers and therefore not unusual, the conditions in our case are somewhat peculiar, as to the more swollen part of the papilla corresponds an atrophic portion of the optic nerve. This is plainly seen in transverse sections of the latter. The central blood vessels contain no blood; in the central vein a few aggregations of round cells are found.

The dura mater sheath of the nerve seems unaltered, except for a certain amount of round-cell infiltration. The pia mater, however, as far as it reaches, is one mass of round cells.

The elements of the ciliary nerves, which I took particular care to examine where I could find them, show nothing physiological, yet in their passage through the sclerotic, these nerves are also filled with round cells.

The case being comparatively recent and the sympathetic affection of the fellow eye so undoubted, I was in great hopes of being able to find micro-organisms in the tissues of this eye. This seemed the more likely since the character of the round-cell infiltration in the different tissues, as described, showing multitudinous tubercle-like aggregations, resembled so much a microbic inflammation. To this end I stained numerous sections according to various methods for the study of bacteria in tissues, yet again, as at former occasions, I was absolutely unsuccessful. Neither at the seat of the injury, nor in the ciliary body, nor in the pia mater sheath of the optic nerve, in which the inflammation evidently spread backwards towards the brain even more fiercely than in the optic nerve itself, could I find any bacteria. My disappointment was as great as my search for the micro-organisms was ardent.

This case, then, is again one of a series of eyes enucleated for undoubted sympathetic disease of the fellow eye which I have carefully examined. The interesting changes are all due to a severe inflammation of the uveal tract (optic nerve and pia mater sheath). This has led, besides the anterior, to the formation of a posterior synechia of the remainder of the iris, and to secondary shrinkage of the vitreous body which had previously become firmly adherent to the posterior lens

capsule and zonule of Zinn anteriorly and to the optic papilla and retina posteriorly. This shrinkage, I think, led to the formation of the cystic cavities in the posterior layer of the iris, to the minute detachments of the retinal layer of the ciliary body, and to a more gross detachment of the retina throughout, as also to the detachment of the membrana limitans interna of the retina near the papilla. The ciliary nerves share in the general infiltration with round cells.

If, as is likely, microbic infection caused this severe inflammation, these organisms have either wandered beyond their original seat of mischief, or they have found their graves in the very tissues which they attacked and stimulated to such fierce reaction.

CATARACT AND CATARACT OPERATIONS.

ABSTRACT OF A CLINICAL LECTURE.

BY HENRY DICKSON BRUNS, M.D., NEW ORLEANS, LA.,

PROFESSOR OF DISEASES OF THE EYE, NEW ORLEANS POLYCLINIC,—SURGEON-IN-CHARGE OF THE EYE DEPARTMENT, EYE, EAR, NOSE, AND THROAT HOSPITAL, NEW ORLEANS, LA.

NOW, gentlemen, having talked about cataract extraction, I shall proceed to do the operation before you, commenting as I go along upon the technique that some fifteen years of experience have led me to believe the best and simplest, and upon such difficulties and accidents as may arise. First and foremost you will not operate upon any eye affected with conjunctivitis, lachrymal cystitis or any inflammatory condition. You will cure such condition before operating. Occasionally, this is impossible, but then you operate at your own and the patient's risk and it must be carefully explained to him and his friends. If the anterior chamber is deep, the pupil sensitive, the cataract ripe, the patient tractable and not extremely old, I try always to do the simple operation without iridectomy. It is the ideal operation; the eye is not mutilated and the pupil retains its function. The great danger in this method is prolapse of the iris either immediately or at any time after the operation before the wound lips become agglu-

tinated and the anterior chamber reformed. To avoid this I formerly used instillations of eserine sulphate, both before and after the operation, until I became convinced that the drug favored instead of preventing the accident I desired to escape. In the first place contraction of the pupil renders the delivery of the nucleus more difficult; the iris is bruised and its contractility impaired; more cortex is scraped off and remains behind in the chamber in the passage of the nucleus through the contracted pupil. This is particularly unfortunate as it gets behind the iris, and the pupil having contracted as the aqueous escaped, and there being no coloboma, it is very difficult to get it out. In the second place you must remember that the contraction of the pupil is only relatively strong and particularly in old people in whom the iris has always lost much of its elasticity and muscular strength. No matter how well contracted the pupil may be by the drug therefore, the iris by its action is merely spread into a smooth sheet; not held in this position as though cut from a piece of stiff note paper, but spread as though cut from delicate tissue-paper, and a very slight force from behind is sufficient to dislocate it from its position. But by contracting the pupil and spreading out the iris in this way we have arranged to expose it in the most favorable way to pressure from behind. For you must remember that the aqueous finds its way into and out of the anterior chamber around the edge of the lens, down the posterior surface of the iris, out through the pupil and up to the corneo-iridic angle where it finally escapes. Now when a peripheral cut exists in the cornea the fluid, impelled by the elastic tension of the eyeball, tends to find its way in a direct line from the lens-edge (ciliary body) to the cut and if the pupil is contracted and the iris spread out across the line of flow it is certainly in the best position to be carried into and involved in the cut, and my experience with eserine undoubtedly confirms this reasoning, which you will find very clearly set forth in the text-book of Fuchs. *Per contra*, since I have adopted the use of atropine, in the form of a 2 per cent. solution, instilled the day before, immediately before and immediately after the operation, I have had much fewer prolapses and more satisfactory results. The iris, contracted to the narrowest possible band, is much less apt to be washed into the cut by the escaping aqueous, and of course iritis is much less apt to occur than

when the membrane is expanded by eserine. A consideration of no small moment, too, is the favorable position for occlusion by inflammatory products and all post-inflammatory accidents when the pupil is contracted, while iritis is little to be dreaded and its consequences almost *nil* if we can only keep the pupil widely dilated. I am done with eserine in cataract extraction; while I prepare for, begin and end the operation with atropine, seeking always to obtain the widest dilatation possible. Next in importance, in the endeavor to avoid prolapse, to the choice of a mydriatic or myotic, is the choice of position for the corneal section. If the section is too far back, in the sclera, behind the apparent margin of the cornea, you are almost certain to have prolapse. In endeavoring to avoid this the section is made well within the limbus, in the substance of the cornea itself, and the chances are that the pupillary border or the middle portion of the iris will be washed into the wound and become entangled, if not actually prolapsed. This is my experience, though many excellent operators advise this position. The great objection that I find, however, greater than the danger of immediate entanglement, is that the wound is removed from the main source of corneal nutrition, the peri-corneal vessels, and instead of getting immediate union, you have a wound that may leak for days and days. This of course invites prolapse and renders some entanglement almost inevitable. After two or three cases, in which I had a long fight with leaking wounds, entangled iris, superinduced iritis, and its consequences, occlusion with subsequent iridotomies, I gave up making my cut in the corneal substance. Such wounds are most liable to suppuration also, though that is a misfortune we have seldom to deal with in New Orleans. I now always make my incision exactly in the corneal limbus. This not only secures prompt agglutination and healing of the wound by placing it very near the area of blood supply and thereby reduces to a minimum the dangers of prolapse or suppuration, but it also gives a bloodless operation, free from the disadvantage of leakage into the anterior chamber from cut conjunctival vessels. Now, though I always try to make the operation without iridectomy, do not misunderstand me to say that I realize that hope in a majority, perhaps, of my cases. If after delivery of the nucleus there is prolapse or a strong tendency to prolapse which can not be reduced by careful manipulation,

the pupil refusing to become small, central and round I take no risks but at once make a small iridectomy directly upwards. I make an iridectomy also in cases presenting much cortex or a thick capsule that can not be removed without undue violence and that persists in the pupil or tends to present in the wound. Only experience and judgment can teach you how persistent the manipulations to reduce prolapse and to clear the pupil should be, but beginners had best err upon the safe side and perform iridectomy rather than manipulate too long. There is no doubt in my mind that the operation with iridectomy is safer; it prevents prolapse, facilitates cleansing the anterior chamber of cortex and shreds of capsule and should inflammation set in the large area of the coloboma renders complete occlusion of the pupil less likely. The safest of all operations is secured by making a preliminary iridectomy and then extracting after all reaction has passed away and healing is complete. I think it my duty to give patients who have but one eye, and that affected with cataract, the benefit of this method in every case; and in such cases I never operate until the cataract is entirely ripe. By making preliminary iridectomy the surgeon has an opportunity to learn the docility and other peculiarities of his patient and the patient learns that the operation is by no means the dreadful ordeal that he has anticipated, for if the eye be thoroughly cocaineized he experiences little and in many cases no pain. As to the lengthening of the period of confinement that has been urged as an objection, I have on the contrary been able to shorten it by this procedure. After iridectomy I never confine the patient to bed and the bandage is only kept on twenty-four hours. Extraction after a preliminary iridectomy can be accomplished so rapidly and smoothly and the pupil be made so clean that there is but little reaction and my patients are never required to stay in bed more than a day. For beginners, with hospital or other patients completely under control, it is far safer to make their first half dozen or so extractions after preliminary iridectomy. In all cases in which I have done the simple operation I remove the bandage at the end of twenty-four hours and at once cocaineize and cut away the iris should it have become prolapsed or entangled.

My chief of clinic Dr. Robin is now preparing the patient. You see he washes the eyelids clean with soap and water and

washes out the upper and lower cul-de-sac of the conjunctiva with an abundance of warm normal salt solution, projected with some force from an irrigator resembling a perforated lid-retractor attached to a rubber bulb. Then a little of a 1 to 3000 formol solution is run through the eye and the forehead and scalp are covered with a clean towel. You see that the pupil is well dilated and both eyes have been thoroughly cocainized. The advantage of cocainizing the other eye is that the patient can hold it open better and fix it upon this or that point as the operator directs undisturbed by the contact of dust or lint, or of the fingers or instruments. The Lippincott syringe filled with sterilized two grains to the ounce solution of boracic acid is in readiness as there is, as you can perceive, a layer of transparent cortex in front of the opacity and I shall probably have to wash out the anterior chamber. This Graefe knife has been well boiled in boiled water containing a little carbonate of sodium and then laid in 1 to 3000 formol solution; so have all the instruments. Not being ambidextrous I stand on the right side of the patient when operating on the left eye; if I were ambidextrous I would stand behind, as when operating on the right eye. There is some doubt in my mind as to the advantage of being what is called ambidextrous, I doubt if any one ever acquires all the skill in both hands that is acquired by a right-handed man who devotes for a life time all his brain to the training of one. It is a question of division and specialization of labor. Of course every operator on the eye must be in a measure ambidextrous. (Here the operation was done).

In making my incision you see that I involved at least two-fifths, probably more, of the corneal limbus. I regard a small incision as an abomination; it scrapes the nucleus clean of cortex, which is left behind in the chamber, and leads to forcible manipulation and bruising of the wound. Although there was much cortex in this case, by following up the escaping lens closely with the spoon making firm, steady pressure, I managed to squeeze most of it out along with the nucleus. I cut the iris away because it showed such a tendency to prolapse that I knew when I took off the bandage after twenty-four hours I should find it in the wound. It proved an example of the inelastic iris of age that I spoke to you of before the operation. Its inelasticity contributed to the one feature of this operation that I am still dissatisfied with, the slight entan-

gement of the iris at the outer end of the wound. However, I do not think more persistent efforts at reduction are justifiable; if it does not reduce itself completely as the anterior chamber reforms it will be better to make another small iridectomy after complete recovery from this operation. I desist not only because we risk bruising and setting up inflammation of the iris, but because the patient is rather deaf, does not hear my directions very well, and seems to have but little control over the eye; all of which rendered the extraction more laborious than it usually is. There was also a tendency to clinch the eyelids that rendered the iridectomy rather difficult, because my assistant in fixing the eyeball and holding the speculum away from it, so interfered that I had no good resting place for my left hand. Incision of the capsule was by no means easy because the patient could not roll the eye down sufficiently and my cystotome was straight with a rigid stem. It was impossible to introduce it in the usual way directly from above; I had to slip it in sideways from the outer end of the wound in a rather awkward manner. A cystotome ought to have a bend in its stem, or better, have a malleable stem that can be bent to suit the case in hand. Finally, gentlemen, I call your attention to the dressing of the eye. Students are apt to turn away after an operation and neglect to observe the details of dressing, and later when they come to operate themselves they are embarrassed by not knowing exactly what to do with the wound they have just made. First, you see, my assistant again washes out the eye thoroughly with the weak formol solution and instills a drop or two of the atropine. Then a disc of linen wet in the weak formol, or a weak carbolic solution, is laid on each eye, and the orbits are evenly and closely filled with absorbent cotton most carefully arranged to produce slight, firm, even pressure on each eye when the bandage is applied. It should not cause discomfort much less pain but keep the eyelids well closed and so gently restrain the motions of the eyeballs. This depends both upon the care and smoothness with which you have arranged the cotton padding and the avenues and closeness with which you apply the bandage. I use a bandage of the best flannel, on account of its elasticity, not too wide. One turn goes around the forehead and occiput and the next comes up under the ear on the side of the eye operated on. This is the all-important turn; the

lower edge of the bandage must completely cover and include every particle of the lower edge of the cotton pad as the bandage passes over the other ear. If you leave any cotton sticking out below the edge of the bandage you will find by next morning that the whole pad has worked itself out on the cheek; for this reason the lower edge of the bandage should turn up and in to the skin forming a little loop or pocket holding the lower edge of the cotton pad. Over the flannel bandage a moist mosquito-bar (bobbin) bandage is placed but not too tightly. As the gum in it dries this bandage "sets" and encloses both eyes and the head as snugly and firmly as if done up in plaster or liquid glass. I know that many of our best men have discarded bandages and now simply close the lids with plaster, but many unfortunate accidents have left me a devotee to this dressing. If well applied, no matter how restless the patient may be, it remains snugly in place for twenty-four to forty-eight hours; it thoroughly protects the eye from a chance blow against furniture or the hand in sleep, by which I have seen many an eye lost, especially in hospital patients, and more particularly negroes; should the patient disregard instructions and attempt to pull at the dressing it will take him a long time so to disarrange this bandage as to inflict injury upon himself, and the attendant will probably catch him at it before any damage can be done; both eyes being closed and the lids kept down the eyes rest quietly, are not rolled about; the tears drain away freely and together with any mucus are absorbed by the dressing; it is aseptic and antiseptic so far as may be with the eye communicating with the outer world through the nasal duct. Theoretically the closure of the eye by a strip of plaster is all sufficient, but such a dressing affords no protection and even if a nurse be constantly employed a chance movement of the hand, or a momentary unseen or unforeseen indiscretion on the part of the patient and an eye is lost forever. How often have I had cause to deplore it! If I kept my patients long tied up and confined to bed I would certainly risk the adhesive strip across the lids, but I do not. In twenty-four hours after the simple operation so that I can clip off a prolapse should it have occurred, or in forty eight hours after an operation, I remove the bandage, inspect the eye, introduce carefully a few drops of borax and camphor water and a drop of atropine and put on a firmly

bound "cataract cage." Should the wound not be closed, however, I remove if necessary, under cocaine, any iris, capsule or cortex that may be interfering with closure and apply the bandage for another day. Only in cases in which there has been much loss of vitreous or serious accident do I keep a patient in bed longer than twenty-four hours and never longer than two days. At the end of twenty-four hours the patient sits up in a comfortable chair with the cataract cages on. I feel confident that there has been great exaggeration in our ideas of the necessity of confinement to bed after cataract extraction. I have often operated here (at the hospital) and allowed my patient to go home the next day and one of the quickest and best results I ever had was in a negro who had to ride a long way in the cars and walk several miles the same morning that the extraction was made. Of course I was able to bandage one eye only, but when the bandage was removed next morning after the same long walk and ride the wound was sealed and the reaction was scarcely perceptible. In a week the man was back at his work, ditching. It is very seldom we keep a patient in the hospital longer than a week; never unless some complication arises. This is not a thing of indifference by any means in these old people. They do not stand confinement to the bed and house well or the loss of their usual exercise and breaking up of long-grown habits. Hypostatic pneumonia and traumatic delirium are common enough and they lose appetite and power to sleep and run down into an alarming condition with surprising ease. Hence I let them out of bed at the end of the first day, and, unless there be very serious objection, out of the house in a week. It is my custom to direct the nurse to give enough paregoric, by teaspoonful doses, the first night, to ensure a good, quiet sleep, otherwise these old people are apt to be wakeful, fretful, excited, sometimes a little delirious. The paregoric ensures rest, insures against accidents, keeps the bowels quiet a day or two and does no harm; does not even nauseate, for a teaspoonful every half-hour, till three or four are taken, is nearly always all that is required. If this patient is comfortable, has had no serious pain in the eye, when I come to-morrow she shall get out of bed, but I shall not probably take off the bandage until day-after-to-morrow, because, since I have done an iridectomy there can not be anything to do and it will ensure the

wound being well agglutinated to have it undisturbed the full forty-eight hours.

This, too, is a case of cataract, but it differs from the other. This is a man who has a partial cataract in both eyes, or rather, he had immature cataract in both eyes. As they seemed to be very stationary and both cataracts had become sufficiently ripe greatly to interfere with his power to support himself, to do any useful work, we decided to ripen the right cataract artificially, in the method we have been trying here of late, by needling or discinding the anterior capsule. This we did two weeks ago. Although the man is about 55 or 56 years of age; soft cortex in considerable amount came forward into the anterior chamber; and while we have had him under observation there is no doubt that a good deal of this cortex has been absorbed, but to-day the eye presents a condition of beginning irritation, and we believe it is not well to delay extraction any longer. All the ripening that can be done by admitting the aqueous humor into the lens has been accomplished. The only thing we could do further would be to break up the lens completely in an endeavor to have it completely absorbed, but that is out of the question in a man of his age. We escaped unexpect- from the use of the syringe in the other case, but I shall be surprised if we do not have to use it in this one, for we are sure there are large quantities of half opaque cortex floating around in the anterior chamber, and I have no doubt a large portion will adhere to the capsule and we will not be able to remove it by ordinary force with instruments, so we will have the Lippincott syringe ready. (Here the operation was done).

There was a shallow anterior chamber in this case, so shallow I had to worm my knife along the upper part of it in order to get between the iris and the lens. That is by no means easy. The prolapse, too, was so very big I had to do an iridectomy, as in the other, and we were disappointed again about using the syringe. The eye was so tense, and in worming my knife along the upper part of the anterior chamber I had to make so extensive a section that all the soft part of the cortex squirted out with the aqueous humor. The aqueous humor acted like the stream from a force pump, and we did not have to use the Lippincott syringe after all. This ought to give a very pretty result. I see that both angles of the iris

seem to have come well down into the anterior chamber. On account of the way I had to make it, this has amounted to almost a linear incision; it has almost no curve to it at all. I had to enter and to come out of the anterior chamber obliquely, and the consequence has been that when I cut out I made the incision that von Graefe advocated in trying to get rid of the danger of corneal suppuration. The eye will now be dressed in the same manner as the other and the patient put to bed for twenty-four hours.

[NOTE.—The ultimate result was good in both cases. The man in whom the cataract was artificially ripened by discission of the capsule had vision of $\frac{20}{xx}$ when glasses were finally adjusted.]

Here I have two more cases of cataract to show you, but of an entirely different kind. These are cataracts that we have made ourselves. When these patients came here neither had cataracts and we deliberately made them in their eyes. Their trouble was extreme near-sightedness. This patient had a fairly good eye on the left side but her right eye was near-sighted about 12 dioptries, so that the glass for her right eye in combination with the mild glass necessary for the left eye would produce a most confusing effect. For you must remember that objects appear very differently through a strong glass than through a weak one and that it is almost impossible for any one to wear glasses of very different strengths before the two eyes. The size of the retinal image is changed with change of strength in the glass. Glasses therefore could not do this patient much good and we explained these difficulties and advised her to have the lens of this eye discinded. By that we mean, have the anterior capsule cut open so that the aqueous can get to the lens substance and gradually dissolve it. This can be done in all persons who are not more than a little over thirty and I have seen it succeed in persons who were beyond middle age. The refractive strength of the natural lens is about twelve dioptries so that if we remove the lens from a normal eye we have to replace it by a glass of this strength, but as this patient is already near-sighted to about this very amount the removal of her lens should make her eye just about perfect for distant vision; provided, of course, that all the structures are perfectly healthy, which, unfortunately,

is seldom the case in high myopia. In performing discission you plunge a very small sharp needle, or I often use a Graefe knife, through the cornea and lightly scratch the anterior capsule. This has been done twice in this case. At the first operation we made a very small discission. The first discission should always be very small; open the capsule only a little, let the aqueous in on the lens substance and find out how the lens and the eye are going to behave. You can open the capsules of some lenses freely and they will hold together well, their consistency is such that they do not ooze through the opening in the capsule; the aqueous humor gets in and the lens becomes opaque very gradually. In other lenses the tendency is to swell very greatly at once, pressing against the iris and ciliary body, the cortical substance exuding through the cut and getting into the anterior chamber, irritating by its presence the cornea and iris. Until you find out how an eye is going to behave, therefore, you should be cautious, for the irritation and inflammation caused by rash discission may bring the eye into a critical condition. This patient had but little reaction after the first operation; the eye flushed up and was painful for a day or two but it soon passed off and we felt justified in making a larger and freer cut. This is the result. You see that there is cortex in the anterior chamber and if you look obliquely you will see more of the soft cortical substance welling forward to take the place of that which has been absorbed. The process is proceeding perfectly safely, there is no irritation; the eye is not flushed and causes no pain. All will turn out well if we are not in too great a hurry, but if we become impatient, stir the eye up with the needle too soon again, or should we be tempted to make an incision in the cornea to spoon or wash out the cortical substance, we may get into great difficulties.

The first case of this sort we ever had here was a little girl about 12 years of age, and who was doing very well, just as this patient is doing; even better, for she was younger, and the younger the better in this operation. Unfortunately, my assistant thought he could hurry along the process and when the eye was just about in the condition of the one I have shown you he opened the anterior chamber and tried to wash out the cortex with the Lippincott syringe. He was not very experienced in the use of the instrument and let the nozzle turn back

from the cornea a moment—that moment was enough. It ruptured the zonula and the vitreous began coming out together with the cortical substance. Of course the operation had to be discontinued at once and the eye bound up. A very serious reaction followed and the child passed into my hands. I worked over that eye for more than a year and a half trying to get good vision. I made three distinct iridotomies. The last was successful and gave her vision,—good vision, because whereas she formerly had about 18 or 20 dioptries of myopia, now it is very slight and she can see quite well at a distance even without any glass. If the doctor had been a little more patient he would have obtained the same result, the eye would not have been deformed, and the child would have been spared much suffering, for some of these iridotomies were so painful, that we had to give chloroform. The whole anterior chamber is deformed, the pupil triangular and eccentric. If an eye is going into a state of active inflammation, if it is painful and troublesome, that does not prevent opening the anterior chamber and removing the cortex. On the contrary, it is the cortex swelling and pressing upon the iris and ciliary body which causes the trouble, and at all hazards you must get it out either with a Daviel's spoon or by washing it out with Lippincott's syringe; but when the eye is doing perfectly well it is safer to leave the anterior chamber closed. Whenever you open the anterior chamber you risk infection and other accidents. We can open the abdominal cavity with safety in a large number of cases but every now and then someone loses his life; so we can open the anterior chamber very many times with no ill consequences, but every now and then an eye is lost. We must remember too that a near-sighted eye is one likely to have an extremely soft or even fluid vitreous and therefore the risk is greater in such cases. It is incomparably better to take a very long time and achieve a satisfactory result than to be quicker and lose even one eye out of a hundred.

Here is the other cataract that we have made. This is a case of precisely the same nature. She is myopic to a very extreme degree in both eyes. In her right eye vision is $\frac{5}{100}$, and in the left eye $\frac{15}{100}$. Her right eye you see is much worse than her left. We advised her that as the glasses she would have to wear would be thick and heavy and the vision they would give probably but little satisfactory, it would be better

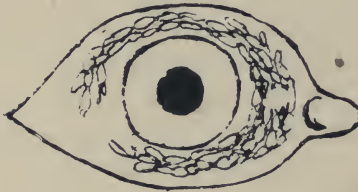
to have the lens removed from the worse eye. We naturally preferred to operate on the worse eye first. When she sees how much she is benefited she will probably wish the other one operated upon also. This you know is a comparatively modern procedure that has been pushed to success by the Germans, and I believe, the case of the little girl of whom I spoke, was the first operation of the kind done in the South. By the South, I mean south of Washington. I do not recollect seeing any reported in the journals. If you look at this eye well you will see in the anterior chamber some loose cortex, quite thin, evidently being absorbed, and behind it a rather thin layer of opaque material composed of the capsule and the rest of the cortical matter locked up in the sac formed by the capsule more or less securely. Of course that is going to be very slowly absorbed and will leave a more or less opaque diaphragm extending across the area of the pupil, and after all the cortex has been absorbed, and there is not the faintest sign of irritation about the eye, we will have to perform discission upon it. We shall probably do this by the somerset operation (see this Journal of December, 1897) with the Graefe knife, that I have already described to you. Perhaps we shall find the diaphragm so tough that it will be better to use two needles for fear of dragging upon the ciliary processes. In this method one needle is first plunged through the cornea a short distance within its margin and then run through the diaphragm; a second needle is passed through the opposite side of the cornea, at about the same distance from the margin, then through the same hole in the diaphragm that was made by the first needle; now by approaching the handles of the needles their points are widely separated and the diaphragm torn without any injurious pull upon the ciliary region. It is very important not to disturb this critical region of the eye and set up an irido-cyclitis for this is not only a very painful inflammation but it is the inflammation of the anterior part of the eye that has the greatest tendency to cause pouring out of plastic material which will again close up the opening you have just made. These cases have done and are doing so well, however, that I think we will be very careful not to jeopardize their success by anything rash.

[NOTE.—August 20, 2897. Both cases gave entirely satisfactory results at an expense of little or no discomfort.]

A CASE OF ACUTE LYMPHANGIECTASIA OF THE
RIGHT BULBAR CONJUNCTIVA IN AN
IDIOTIC CHILD.

BY ADOLF ALT, M.D., ST. LOUIS, MO.

PATIENT, D., aged 13 years, an idiotic girl, was brought to me with the following history: Ten days ago, in the morning, no injury of any kind preceding, a small reddish tumor was noticed near the lachrymal caruncle of the right eye, which before had never shown anything abnormal. During the following days this tumefaction had gradually spread till it had almost reached the outer canthus.



When I saw the child, there was an enormous number of lymph vessels dilated by a fluid tinted with blood pigment. The number and size of these dilated lymphatics was largest near the caruncle. The lymphangiectasia formed almost a ring around and some distance from the periphery of the cornea (see Figure) open only near the outer canthus. There were some punctiform hæmorrhages in the conjunctival tissue between the ectatic lymph vessels.

Vision was normal. The lower retinal vein was very broad and tortuous.

Under massage and hot bathing the ectasia began to grow less after three days, the swelling first receding near the lachrymal caruncle, the point from which it had started. When she left for home, a few days later, the swelling was considerably reduced.

The bloody appearance of the lymph contained in the ecstatic lymphatics was very much less pronounced on the second day of my observation of the case and in a few days more, the lymph had only a slightly yellowish tint. There must evidently have been a hæmorrhage into the conjunctiva (as is, I hear, often observed in idiots) which in this particular case entered and spread into the lymph vessels only, without general diffusion into the conjunctival tissue.

The case seemed to me particularly interesting as it showed *in vivo* a beautiful injection of the conjunctival lymph vessels.

Waldeyer (Graefe and Saemisch, Vol. I, 248) says: "The lymphatic capillaries of the conjunctiva scleræ form a network of very much larger trunks (than those of the limbus corneæ). Four or five millimeters distant from the corneal margin they run parallel with each other, and form larger trunks with valves which run towards the inner and outer canthus. They lie beneath the finest capillaries."

This description tallies pretty well with the appearances in the case under consideration, although it looks as if the larger and largest trunks were situated near the lachrymal caruncle.

CLINICAL MEMORANDA.

OPHTHALMIC CLINICAL NOTES.

BY DAVID WEBSTER, M.D., NEW YORK.

CASE I. EXTRACTION OF THE REMAINS OF A MOSTLY ABSORBED, TRAUMATIC CATARACT.—Judson H. M., aged 29 years, lawyer, entered the Manhattan Eye and Ear Hospital on November 25, 1890, with the following history: He received the first of a series of injuries to his right eye some fifteen or sixteen years ago by getting a blow upon it with a corn-cob. He lost the sight of it entirely for a few days, but finally came out with some vision, though a cataract formed soon after. Three years later, he was struck in the same eye with a horse-chestnut which caused a "heavy inflammation," but he got over it with about the same amount of vision that he had before getting it injured the second time. Two years after that he was struck in the same eye by a snow-ball and this, also, caused a "heavy inflammation." An ophthalmic surgeon in Albany treated him for this injury and the eye recovered in apparently as good condition as before the blow. Six months later the eye was injured a fourth time by being struck with a tin can, but escaped with but little inflammation. Three years later, in 1883, he contracted a severe cold which was followed by an iritis of the oft-injured eye. Under skillful treatment he recovered from this attack in about a month. Three years after that, in 1886, he had an attack of rheumatism which confined him to his bed for three months. This was followed by an attack of iritis in the left eye from which he did not recover for three months. In 1889 he had a slight attack of inflammation in the right eye, but recovered in a few days. Three weeks ago he had another attack of inflammation in the right eye which caused him to seek my advice. This attack passed off, under instillations of atropine and cocaine, in less than a week. When I saw him his left eye was normal and had vision = $\frac{20}{xx}$. The right eye presented an irregular pupil, blocked with the degenerated, membranous remains of a partially absorbed cataract. It showed an iridodonesis, or tremulousness of the iris on moving the eye, which

was probably due to a fluid vitreous. But there was not only perception of light but the projection was perfect, showing that the retina and optic nerve were intact. To obviate his repeated attacks of iritis and to give him what sight the eye was capable of, I proposed to extract the shriveled remains of his cataract. Accordingly, the eye was cocainized and washed with a saturated solution of boric acid. The eyelids were held open by a spring speculum. With fixation forceps I seized the conjunctiva close to the cornea at its infero-nasal margin, so as to steady the eyeball, and to a certain extent, to control its movements. I then made an incision through the cornea, about a line from its temporal margin, with an iridectomy knife, or angular keratome. The knife being withdrawn, the aqueous humor followed it, and the membrane was pushed forward by the vitreous humor until it was almost in contact with the posterior surface of the cornea. I then introduced a delicate, sharp hook and made two attempts to catch the membrane and pull it out of the eye. Both of these attempts failed because of the brittleness of the membrane. It was not tough enough to hold on to the hook. I then resorted to the iris forceps and to Daviel's cataract spoon, and succeeded in getting the cataractous remains out of the eye piecemeal. There were six pieces in all. The pupil was left almost entirely clear. The eye was again washed with the aseptic solution and both were bandaged and the patient put to bed.

November 27. The patient has rested quietly since the operation. The eye was opened for the first time this morning, about forty hours after the operation. There is no inflammatory reaction. A small piece of the membrane remains but does not obstruct the pupil. The eye is to have atropine instilled thrice daily.

December 1. The pupil is moderately dilated and circular. Vision = $\frac{20}{xxx}$ with + 7 D. \odot + 3 D. c. ax. 105° .

December 24. The eye seeming sufficiently well, the patient was discharged with vision = $\frac{20}{xl}$ with + 6.50 D. s. \odot + 3.25 D. c. ax. 115° .

January 30, 1891. Right eye, vision = $\frac{20}{xxx}$ with + 8 D. s. \odot + 1 D. c. ax. 90° .

March 30. The patient has crossed diplopia. Prism 14° base to nose and prism 2° base down over right eye fuses the double images.

A tenotomy of the right externus was suggested but the patient seemed to be satisfied with his condition and we did not see him again. It is interesting to note the gradual clearing up of the vision and the change of refraction in the operated eye. The astigmatism of three and a quarter dioptries was reduced to one dioptrie. The hypermetropia of six and a half dioptries was, meanwhile, increased to eight dioptries. The axis of the cylinder correcting the astigmatism following cataract extractions is almost always horizontal or nearly so. That is, it is parallel to the corneal cut. So it was in this case. The corneal wound was vertical and so was the axis of the cylinder correcting the resulting astigmatism. High degrees of astigmatism resulting from wounds of the cornea always become less and often entirely disappear as the corneal cicatrix becomes firmer and smoother.

CASE II. ULCER OF THE CORNEA BENEFITED BY PARACENTESIS.—James R. C., aged 41 years, came to my clinic November 26, 1890, with an ulcerative keratitis. He gave a history of attacks of inflammation of the right eye occurring at long intervals for the last fourteen years. The first attack occurred fourteen years ago. The second attack was eight years ago. For this attack he applied a "potato poultice" and came very near losing the eye. He had a third attack of a similar character, but less severe, two years ago. The present trouble came on four weeks ago, with lachrymation, photophobia, pain and redness of the eyeball. For the last two nights he has not been able to sleep on account of the pain. Upon inspection we found a ragged ulcer on the infero-nasal quadrant of the cornea with a diffuse opacity, due to infiltration, extending around it. Ophthalmoscopic examination revealed the presence of floating bodies in the vitreous. Vision = $\frac{2}{60}$. Tension of the eyeball greater than normal.

The patient was admitted to a bed in the hospital. The eye was cocainized and washed with Panas' fluid. The operation of paracentesis of the cornea was performed with a Graefe's cataract knife, the eyelids being held open with the fingers of the operator and great care being taken not to touch the anterior capsule of the lens with the point of the knife so as to avoid producing a traumatic cataract. The use of the speculum and fixation forceps should be avoided in such cases as they only render the operation the more painful, because co-

caine fails to render the inflamed conjunctiva anæsthetic. It renders the cornea analgesic and the only pain that follows, when only the fingers and knife are used, is the result of the sudden excavation of the anterior chamber. Atropine was instilled and a bandage applied over both eyes.

November 27. There has been no pain save that immediately following the operation. The anterior chamber is re-established. To have cleansing and atropine twice a day.

December 1. Ulcer healing rapidly. Less redness and lachrymation.

December 3. Continued improvement. The ulcer is nearly healed. The redness is passing away. Vision = $\frac{18}{60}$. The other eye has never been inflamed and has vision = $\frac{20}{x}$. Discharged.

It will be observed that when this patient came into the hospital the vision of the inflamed eye was $\frac{2}{60}$ and that he was discharged with vision $\frac{18}{60}$, nine times as much as he came in with. But the healing of a large corneal ulcer always produces a scar, which always constitutes an opacity of the cornea and in the adult causes permanent impairment of the vision.

CASE III. SYPHILITIC IRITIS OF BOTH EYES.—Joseph McC., aged 21 years, became an in-patient at the Manhattan Eye and Ear Hospital December 15, 1890, on account of an attack of iritis of both eyes. He said that for the last six years he had had attacks of pain over his eyes coming on daily at the same hour for weeks at a time, with occasional intermissions of a week or two. These pains were probably malarial and certainly had very little to do with the present attack. About a week ago both eyes got red and the sight became blurred. Upon inspection we found deep circum-corneal redness, discoloration of the irides and small, dull looking pupils with vision reduced to $\frac{20}{L}$ in each eye. A diagnosis of iritis was made and was confirmed by the adhesions of the pupillary border of the iris to the anterior capsule of the lens that appeared in both eyes within half an hour after a drop of solution of sulphate of atropia, 1 per cent., had been instilled. Upon inquiry we learned that the patient had contracted syphilis some three months before and this left us no doubt as to the causation. The patient was put to bed with instructions that a slight perspiration be kept up. He was put upon mercurial inunction and was ordered ten grains of iodide of potas-

sium, internally, three times a day. A drop of a 1 per cent. solution of sulphate of atropia was ordered to be dropped into both eyes once every four hours and the eyes were to be bathed with hot water for fifteen minutes every hour.

December 17. Both pupils were well dilated, all the adhesions having been broken up.

December 19. The pupils are not so well dilated. Both eyes are to have atropine dropped into them four times in an hour four times a day.

December 21. Both pupils are widely and evenly dilated. The irides are much improved in color. The circum-corneal redness is much less. As tenderness of the patient's teeth had begun to develop, and as the mercury seemed to have accomplished all that was expected of it the inunction was ordered to be stopped; the bathing with hot water was continued *pro re nata*; the atropine and the iodide were continued as before.

December 25. Both eyes being nearly well, the vision of the right having risen to $\frac{20}{xxx}$ and of the left to $\frac{20}{xl}$, and the redness of the eyeballs having mostly disappeared, the patient was discharged from the wards, medium smoke coquilles were prescribed for him, and he was directed to continue the treatment as an out-patient until entirely well.

SOCIETY MEETINGS.

PRELIMINARY PROGRAMME OF THE WESTERN OPHTHALMOLOGICAL, OTOLOGICAL, LARYN- GOLOGICAL AND RHINOLOGICAL ASSOCIATION.

MEETING AT CHICAGO, ILL., APRIL 7 AND 8, 1897.

Joint morning session at 9 A.M.
Address of Welcome; Dr. E. L. Holmes, Chicago.
Response, Dr. A. Alt, St. Louis.
President's Address, Dr. B. E. Fryer, Kansas City, Mo.
Reception of Guests. Registration of Members.
Reports of Secretary and Treasurer.
Report of Committee on Membership.
Election of Members.
Address (by invitation), Dr. H. Knapp, New York City.

Papers have been arranged for as follows :

OPHTHALMOLOGICAL SECTION

- Paper by Dr. H. V. Würdemann, Milwaukee.
 Colored Ophthalmoscopic Picture, by Dr. C. H. Beard, Chicago.
 Paper by Dr. J. Ellis Jennings, St. Louis.
 Paper by Dr. A. C. Corr, Carlinville, Ill.
 Paper by Dr. C. Barck, St. Louis.
 Recent Researches Into the Histo-Pathology of Trachoma, by Dr. A. Alt, St. Louis.
 The Antiseptic Preparation of the Conjunctiva for Cutting Operations on the Eyeball, by Dr. B. E. Fryer, Kansas City, Mo.
 Dacryocystitis—Its Significance and Treatment, by Dr. A. E. Bulson, Jr., Fort Wayne, Ind.
 Four Cases of Parinaud's Conjunctiva, by H. Gifford, Omaha, Neb.
 Paper by Dr. Frank Allport, Chicago.
 Miscellaneous Note From Fifteen Years' Experience in Eye Diseases, by Dr. Barton Pitts, St. Joseph, Mo.
 On the Use of Suprarenal Capsule Extract in Minor Eye Surgery, by J. A. Mullen, Houston, Texas.
 The Science of Ophthalmology, by Dr. Dudley E. Reynolds, Louisville, Ky.
 Use of De Zeng's Refractometer, by Dr. T. A. Woodruff, Chicago.
 Report of a Case of Tumor of the Cerebellum, by Dr. E. W. Heltman, Toledo, Ohio.
 Moot Questions in Refractive work, by Dr. Gradle, Chicago.

MICROSCOPICAL AND PATHOLOGICAL.

- Specimen by Dr. Homer M. Thomas, Chicago.
 Dr. Cassius D. Wescott, Chicago.
 Dr. A. Alt, St. Louis.

PRESENTATION OF CASES.

- Dr. Cassius D. Wescott, Chicago.
 Dr. Casey A. Wood, Chicago.

NEW INSTRUMENTS.

- Dr. C. Barck, St. Louis.
 Dr. J. Ellis Jennings, St. Louis.

Members are requested to notify the Secretary Dr. FRANK M. RUMBOLD, Century Building, St. Louis, Mo., if they desire to read a paper, giving title, and all members are requested to bring, if possible, interesting pathological or microscopical specimens.

Reduced rates have been secured for members attending the meeting and everything indicates a large, profitable and enthusiastic session.

MISCELLANY.

TRACHOMA.

Trachoma, or, as it is called, "the Egyptian eye disease," a contagious eye disease, which is endemic in the eastern provinces of Prussia, occupied the last meeting of the Berlin Medical Society. Surgeon-General Kirchner, of Königsburg, who read a paper introducing the subject proved by an array of figures the serious dimensions that the epidemic has assumed of late years, and pleaded earnestly for vigorous measures to be taken against it. It is, he says, essentially a filth disease which Russian harvest workmen bring into the eastern provinces year by year, where it finds conditions highly favorable to its spread and continuance amongst a population indolent, poor, dirty, and addicted to drinking. As (where proper precautions are neglected) trachoma is highly infectious, it is not rare to find whole families victims to it, while schools have to be closed when a serious outbreak occurs. Even in the army it disables a great many men, though happily the number has considerably decreased during the last few years, since the inauguration of more stringent hygienic measures. Dr. Kirchner said that from 1873 to 1889 the figures had been :

Of 100,000 men—

2,099	attacked by trachoma in 1st Corps (East Prussia.)
1,649	" " in 2d " (West Prussia).
1,031	" " in 5th " (Posen).
715	" " in 6th " (Silesia).
398	" " in 10th " (Hanover).
245	" " in 9th " (Schleswig - Holstein).

There were no cases to speak of in the rest of the army. Dr. Kirchner summed up by saying that the harm done by the epidemic was three-fold : (1) Education suffers in the attacked provinces, the schools having to be closed from time to time ; (2) the population's earnings decreased, as in consequence of

the ensuing gradual contraction of the conjunctiva, and the encroachment of the disease on the cornea, the visual power diminishes until often enough total blindness sets in; and (3) the prevalence of the disease in the army weakens the national power of defense. He strongly advocated the following measures: (a) special trachoma hospitals; (b) special instruction for doctors, as those who come from the western provinces, never having seen the disease, are unskilled in detecting it; (c) gratuitous treatment; (d) periodic examinations of the school children; (e) supervision of the floating population; (f) public instruction of the poorer population by schoolmasters, clergymen, etc., as printed instructions are hardly taken notice of; (g) collection of reliable statistics, and (h) appointment of special medical officials to carry out the above measures, and grants of sufficient funds by the State.

Professor Hirschberg opened the discussion on Dr. Kirchner's paper. He said that two years ago he was commissioned by the Government to report on the prevalence of trachoma in the eastern provinces. He had examined 7,000 persons, and found 10 per cent. of the population affected, 2 per cent. seriously so. In the village schools the number of cases was greater than in the higher class town schools, but even in these latter the number was never below 5 per cent. As regarded Berlin, the disease was brought in frequently, but had never spread, so that many experienced practitioners had never even seen a case of it.—*British Medical Journal*.

BOOKS AND PAMPHLETS.

THE DISEASES AND INJURIES OF THE CONJUNCTIVA, ESPECIALLY SO-CALLED GRANULATED LIDS. By J. H. THOMPSON, M.D. Hudson-Kimberley Publishing Co., Kansas City, Mo. 1897.

A readable compend on the disease of the conjunctiva, embodying the author's ideas, which in some instances are at variance with what is generally accepted as correct. The rules as to treatment are safe and commendable.

PAMPHLETS.

"Water Purification," by C. G. Currier, M.D.

"What are Muscæ Volitantes?" by F. P. Pratt, M.D.

"Bilateral Syphilitic Ulceration of the Auricle," by M. A. Goldstein, M.D.

"Advanced Method in Teaching the Deaf," by M. A. Goldstein, M.D.

"Some Methods in the Treatment of Nasal Troubles," by J. C. Montgomery, M.D.

"Shall We Operate Through the Upper and Lower Canaliculus?" by S. C. Ayres, M.D.

"Sixth Annual Report of the Charity Eye, Ear and Throat Hospital of Erie County, 1897."

"Twenty-Eighth Annual Report of the New York Ophthalmic and Aural Institute, 1897."

"Melanosarcoma of the Conjunctiva, With the Report of a Case," by A. R. Baker, M.D.

"The Texas Screw-Worm and Its Invasion of the Nasal Cavities," by M. A. Goldstein, M.D.

"What are the Functions of the Rods and Cones and the Pigment Epithelium Layer of the Human Retina?" by F. P. Pratt, M.D.

"Two Cases of Opening of the Lateral Sinus for Infective Thrombosis, With a Table of Operations Performed Previous to 1897," by C. Barck, M.D.

THE AMERICAN JOURNAL OF
OPHTHALMOLOGY.

VOL. XV.

MARCH, 1898.

NO. 3.

ORIGINAL ARTICLES.

A STUDY OF OCULAR COLOBOMA.

BY SWAN M. BURNETT, M.D., PH.D., WASHINGTON, D. C.

PROFESSOR OF OPHTHALMOLOGY AND OTOTOLOGY, MEDICAL SCHOOL, GEORGETOWN
UNIVERSITY, WASHINGTON, D. C.

WHILE instances of coloboma of one or more coats of the eyeball are not among the extreme scarcities in ocular anomalies, the unsettled state of opinion as to their nature and causation warrants the record of any example that promises to throw some additional light on the question of their origin. This is my justification for a report and study of the following cases:

T. W., aged 40 years, came to my clinic at the Emergency Hospital on account of an injury to the left eye, caused by the explosion of a fire-cracker on the 4th of July, 1897. A grain of powder had passed through the cornea and lodged in the iris, and there were several grains in the conjunctiva. A glance showed the existence of a downward coloboma in both irides and led to a detailed examination of both eyes as to the conditions which are here reported. Of the injury, it will suffice to say, that under treatment it went on to recovery leaving a posterior synechia of the upper edge of the pupil to the lens capsule, and a slight corneal opacity.

RIGHT EYE.—The *coloboma of the iris* is represented in

Fig. 1, the pupil being under the influence of atropia. There is a thin streak of opacity in the lens just at the seat of the coloboma and near the margin. Whether or not this opacity is congenital it is impossible, now, to tell, but as there is no history of trauma, and there are no spiculæ of opacity elsewhere in this lens or in the other, the inference is that it is. The vision is $\frac{5}{xxxv}$, but with -1 at 75° it is increased to $\frac{5}{xxx}$. This has always been his worse eye. The cornea, examined by the ophthalmometer, was found to be within the normal curvature having 41.5 D. at 75° and 42.5° at 135° , at the point of fixation, showing, however, a departure as to the relative direction of the axis of the meridians, due no doubt to a large angle alpha.

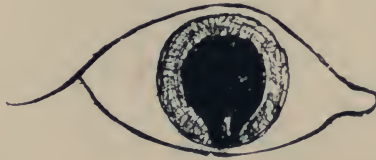


FIG. 1.—Coloboma of iris, with slight lenticular opacity. Right eye of T. W.

The ophthalmoscope revealed the appearances shown in Fig. 2. This drawing represents with very considerable accuracy the topography of the back ground, being the outcome of numerous sittings and many careful sketches. A first inspection shows a very bewildering collection of vessels running in all directions, seemingly on no definite plan and greatly at variance with the usual system of distribution. A careful study, however, will soon extract some order out of the chaos, and a modification—though a very extensive one—of the regular vascular distribution can be made out.

A coloboma of the choroid stretches from the margin of the optic nerve entrance as far forward as can be seen, and undoubtedly extends through the ciliary body to meet the coloboma of the iris which is in direct line with it. It also, apparently, passes up beyond the nerve head, since the exit of the retinal vessels seems to be far below the upper border of the defect. What must be considered as the lower edge of the disc lies as much as three ordinary disc-diameters below the upper edge of the defect. (The drawings are made from the

inverted image, but will be referred to in their normal relations as seen in the direct image). The lower edge of the disc is quite clearly defined.



FIG. 2.—Fundus of right eye. T. W. A, the arteries; B, large tortuous vein possibly choroidal; C, choroidal veins; D, vessel at edge of disc; E, Varicose retinal vein. — 3 and — 10 number of concave glass required to see the fundus at that portion of the eyeground.

The retinal vessels coming up to its edge and dropping down with a short curve disappear under it. In most cases it is possible to distinguish the arteries (A) from the veins (V) by their straight course and smaller caliber. It will be noticed (and this is the case with the other eye, Fig. 5), that the arteries are much thinner than usual, whereas the veins are of about normal size. A careful analysis will reveal the presence of what, in the normal distribution, would be a superior and inferior, one nasal and two temporal arteries, while one vessel running down and out and which is very tortuous at the beginning is doubtful as to classification. The same is true of some fine vessels springing from the lower edge of the disc and running outwards for a short distance. One vessel, marked (B), is also difficult to classify. It starts from among the fibers of the

disc not far from the upper edge, is very tortuous in its course and ends abruptly at the choroidal edge in a dense mass of pigment. Another peculiarity of the vessel is that it lies deeper than any of the other vessels, requiring a — 17 to be seen distinctly at its point of origin. The one marked D also starts deeply and curves round what seems to be the edge of the disc, losing itself in a fine point, but evidently giving off some of the vessels which run laterally. The vessels marked C have very indistinct outlines and must be regarded as choroidal, since they have no connection with the retinal system. At E we have a very large, almost varicose, branch of a retinal vein which disappears at the edge of the choroid. In no other portion of the area of the coloboma are there any apparent remnants of choroidal structure. The edge however is strongly pigmented in places. Starting from the lower edge of the disc there are dark band-like areas with edges sharply defined at the beginning but gradually losing this definition to become diffused, going upward and outward toward the upper border of the disc which, however, can not be clearly outlined. This area, it seems to me, is the optic disc very much stretched and elongated backward. That the main portion of the disc is displaced below its normal position, is evidenced by the fact that the macula lutea, as indicated by the point of fixation, is about on a level with the exit of the upper choroidal vein, while the exit of the lower veins at the sharp edge of the disc is at least one disc diameter and a half below the macula. The extension of the coloboma above the optic nerve entrance is therefore more apparent than real, the upper edge of the choroidal defect no doubt representing approximately the upper edge of the disc. The whole picture suggests the appearance as if the optic nerve had been seized by its lower edge and pulled strongly downward, the upper edge remaining stationary, as shown in Fig. 3, where A represents the lower edge of the optic nerve in its normal position pulled backward and downward to B. This represents quite well the appearances which are usually designated "coloboma of the optic nerve and optic nerve sheath." We shall see, however, that it does not at all necessarily signify a defect in the continuity of either of those structures. The surface of the defect is not all of the same radius of curvature, some portions lying much behind the others. At the upper edge of the coloboma of the choroid the refraction

as determined by the ophthalmoscope is emmetropic; some distance below it is -3 , and below the lower edge of the stretched disc it is -10 . The shadow test applied to different parts of the coloboma shows emmetropia at or near the upper part of the defect passing over to -12 for the anterior part as far forward as it could be applied. All this shows conclusively that the optic nerve and the tissues of the fundus at this part had been pushed back as indicated in the Fig. 3.

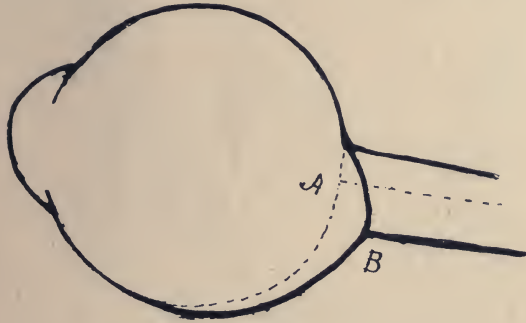


FIG. 3.—Stretching of the back of the eyeground, and especially the the nerve head from pressure. The nerve head, A, is dragged back and stretched until it assumes the position and form shown at B.

The *visual field* is given in Fig. 4 and shows limitations corresponding pretty accurately with the defect in the back-

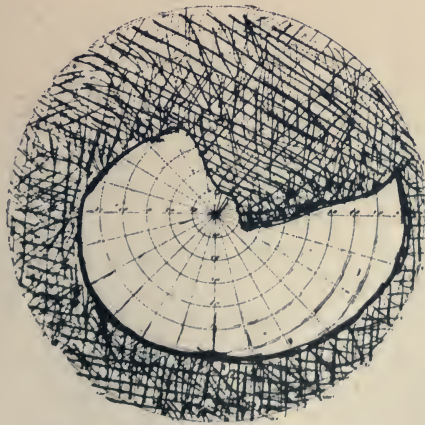


FIG. 4.—Visual field of right eye.

ground. It will be noticed that the defect to the temporal side passes below the point of fixation at a place corresponding to the locality of the optic nerve entrance, caused, no doubt, by an extension of the normal blind spot and due to the anatomical conditions revealed in Fig. 2.



FIG. 5.—Fundus of left eye. V, choroidal vein; A, remnants of choroidal stroma; B, atrophic spot in the choroid.

LEFT EYE.—The *iris coloboma* is the counterpart of that of the right. The *choroidal coloboma* is shown in Fig. 5. As will be seen this differs in several particulars from that of the right and this is especially noticeable as regards the optic nerve. The *nerve head* here assumes the form of a horizontal oval, which it is commonly represented as having in the typical pictures of coloboma of the optic nerve and optic nerve sheath seen in the atlases. It is of a dull color without any tinge of red and its scheme of vascularization differs widely from the normal. From near the center of the coloboma there springs a large vessel (V) which runs some distance, then bifurcates and one branch disappears at the choroidal edge apparently entering the choroid. It evidently belongs to the choroidal and not to the retinal system of vessels. In its immediate vicinity

there are two spots (A, A), which are evidently the remains of the choroidal stroma. In this eye, as in the other, the arteries are of abnormally small calibre. To the upper and inner quadrant (lower and outer in the figure) of the disc there is a spot of choroidal atrophy about half the size of the disk, but separated from it by apparently normal tissue. On the surface of this spot there are remains of vessels and choroidal stroma. The rest of the fundus does not depart from the normal. The *visual field* is given in Fig. 6. and shows the same dip down

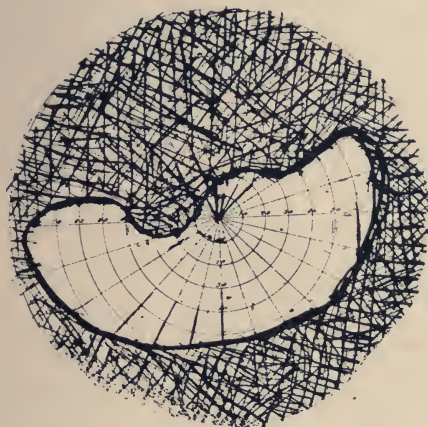


FIG. 6. - Visual field of left eye.

below the point of fixation we find in the other eye. There is, however, a greater restriction down and out than in the right eye. On account of the iritic adhesions and the corneal opacity,—results of the injury,—it was not so easy to make exact measurements of the depth of the coloboma, but it was determined that the upper edge of the disc was emmetropic, while it required a — 3 to see the lower edge. In the area of the coloboma itself the vessels were not sufficiently well outlined to enable even an approximate estimate of their position to be made. The shadow-test, however, revealed a high degree of myopia in that region of the background. $V. = \frac{5}{xxx}$, notwithstanding a considerable opacity of the cornea which gave rise to quite an amount of irregular astigmatism as revealed by the ophthalmometer. Before the accident this was his better eye and with it he could read without difficulty.

As regards *family history*, he states that his father had a slit like his own in both eyes, and that his vision was always bad; that a brother had a slit in the iris of the left eye, and that the iris in this eye was black, while that of the other was blue. His own irides are blue.

It is difficult to reconcile fully the appearances found in most cases of coloboma oculi with the manner of development of the eye at present recognized by embryologists, and the cause that has by almost common consent been assigned for them—namely, a failure of the foetal cleft to close.

As regards the *iris* it is to be remembered that the whole anterior part of the uveal tract—iris, ciliary body and processes, are developed only in part from the choroidal portion of the enveloping mesoderm. The inner and pigment layers of the iris are developed from the retinal layer and not from the choroidal layer, the latter furnishing the stroma and blood vessels. The development of the iris does not commence before the beginning of the third month, and some time after the closure of the foetal cleft, and the foetal cleft while it reaches, does not involve the region from which the iris is developed. Moreover, there is at no time during the development of the iris any thing resembling a cleft. It is developed uniformly in all directions from the periphery towards the center. As, however, the interior layers of the iris are developed from the retinal layer there would seem to be some justification for a coloboma iridis being connected in some way with a genuine non-closure of the cleft, when one existed. As, however, there is lacking in such cases any convincing evidence of a failure of the cleft to unite we must seek other causes. It seems most probable, in the light of the facts now in our possession, that the origin of coloboma of the iris is connected in some way with an interference with the blood supply as first pointed out by Arnold in 1838. It seems almost certain, too, as suggested by Posey, in a recent paper on the subject, that the iris is developed in segments, rather than in a continuous circle, and an interference with the development of one of those segments,—it may be through a faulty vascular supply,—would be likely to lead to some one of the iritic anomalies such as coloboma, partial or complete correctopia, or some of the lesser anomalies, such as decoloration. What lends plausibility to this idea is the fact that these anomalies are found at any segmental part of the iris.

We have coloboma of the iris downward, upward, outward, inward or obliquely in any of these directions, and the pupil may be shifted in almost any direction from the center. Some instances of early arrest of development on the part of the iris substantiate this view. In 1875 I reported in *Knapp's Archives* (Vol. IV) a case of rudimentary iris in which this segmental character of development is clearly shown (Fig. 7). Here it would appear all the segments were arrested very nearly equally and at the same time. If, however, the arrest had been limited to any one segment we would have the necessary conditions for a coloboma iridis and it need not necessarily be downward in the direction of the foetal cleft. It will be noted that there is also in the case (which was bilateral) a central opacity of the lens capsule. In respect to the *choroid*, however, it is easy to see how this theory has some apparent foun-

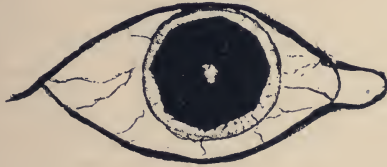


FIG. 7.—Rudimentary iris, showing the segmental development of the iris — ; opacity at center of the lens.

dation in the facts. Colobomata of the choroid occupy, with very rare exceptions, the position of the foetal cleft, and the defect is of such a character as to indicate its congenital origin and point to some defect in development. The non-closure of the foetal cleft, therefore, at first blush, offers itself as the readiest solution of the anomalous condition.

In order to a clear understanding of how far this may be true let us briefly review the most recent and accepted accounts of the method in which the eye is developed. The optic stalk springs from the cerebral vesicle as a hollow tube and on its end is formed the primary optic vesicle. This vesicle is invaginated by the mesodermal layer from below (after the lens has made its way in from above) pushing the wall of the vesicle before it until the cavity is obliterated by contact of its own opposing walls. The cavity is now filled with the mesoderm, which also extends itself around the exterior of the primary vesicle, holding the walls of the primary vesicle, now one mem-

brane, between its interior and exterior portions and forming the secondary optic vesicle. The interior and exterior portions of the mesodermal structure are connected through the space left in the primary optic vesicle when the mesoderm invaginated it. This space is called the *fœtal* or *choroidal cleft*. In time this space is covered over by the development and extension of the walls of the primary optic vesicle and becomes a part of the *retina*. The mesoderm which remains in the interior of the vesicle becomes the *vitreous*, and the outer mesodermal structures, which surround the primary vesicle, form the *choroid* and *sclera*. The cleft in the primary vesicle is usually closed by the end of the second month.

It necessarily follows, if this be true, that a failure of the fœtal cleft to close must affect, primarily, the retina, since this is the only tissue in which there is a discontinuity of tissue. There is not, nor can there be, a cleft in the mesoderm, for it is continuous through the cleft interiorly and exteriorly, and the exterior portion, forming the sclera and choroid is continuous without a break. Whatever defects of structure may follow from abnormal or arrested development at this place, an absence or serious defect in the retina must be the first and a necessary one. It is possible that the mesoderm at the place of intrusion may from some cause fail in proper development and of course then some abnormal condition must result; but if the processes are so far normal as to bring about a perfect formation of the sclera there seems no just reason why the choroid, developing from the same tissue, should be entirely lacking. In fact, a failure of the fœtal cleft to close should carry with it an absence, at that locality, of both sclera and choroid. Instances of this, no doubt, are those cases of so-called anophthalmos or microphthalmos in which a large cyst occupies the place of the eye or springs from its undeveloped structures. This is most likely due to a failure of the cleft to close or to a failure of the mesoderm to invaginate the primary optic vesicle, with a misdirection of the developmental processes. But the normal development having gone on to the formation of the sclera, which virtually completes a closure of the fœtal cleft, it is hard to see how any conditions found in the choroid, which is developed from the same material as the sclera, can be referred to a non-closure of the cleft. It is admitted, however, that this region, which is the meeting place of

several developmental forces, is more likely than elsewhere to be the seat of abnormalities of which a failure of the cleft to close is only one and probably a rare one, and would render it more liable to arrests or deviations in development or pathologic processes of various kinds.

That these anomalies are due for the most part to arrest or a defect in development is evident from their appearance. This is shown in the character of the vessels—the smallness of the arteries, and tortuosity of the veins and the peculiarity in their distribution; also in the appearance of the disc in some cases where the abnormality has extended to that tissue. Of course these might be, but it is hardly possible that they are, the results of an inflammation *in utero*. They have all the features of congenital anomalies, the result of defective development. There are other appearances, however, which are very like the changes we should expect from inflammatory processes and their results. The edges of the coloboma are, as a rule, heavily pigmented, at least at places, and there are remnants of choroidal stroma and pigment within the area of the coloboma, and it is very common to find choroidal vessels present and sometimes quite a number, as in the two eyegrounds in Figs. 2 and 5, as well as the one shown in Fig. 8. That the conditions which we usually see are due, in a measure at least, to some sort of morbid processes, set up after the eyeball has been developed to something near its adult state there is, it seems to me, preponderating evidence. In nearly all cases the vessels of the retina are seen coursing over the defective space, and in some instances where the eye has come to a section, remnants of the retinal tissue have been found. Indeed Pause reports (*Graefe's Archiv*, xxiv, 2, 1878) a case where a perfectly normal retina was found over the entire extent of the coloboma. This would seem to show that the causes operating to produce the choroidal defect came after the time of the retinal development, and that they should in no sense be referred to a failure of the foetal cleft to close. The formation of the retinal vessels does not take place until sometime after the cleft is closed, and their existence is therefore a proof that the primary vesicle has progressed normally in its development up to that point in the formation of the retina. The eyeground represented in Fig. 8 shows not only the proper distribution of the retinal vessels but also apparently normal

choroid forming a bridge across the coloboma dividing the space into two, and also a normal strip dividing these from the normal-appearing optic disc. It will be seen, too, that the coloboma does not extend to the periphery. There was associated with it a coloboma of the iris, likewise downward. The other eye was normal. Moreover, it is difficult to account for the atrophic choroidal spot B, in Fig. 5, on any supposition other than that it is the result of a choroiditis. There are vessels and remains of stroma and the pigmented edges which we are accustomed to find as the result of inflammation of the choroid. As to those colobomata of the choroid which have been ob-



FIG. 8.—Partial coloboma of choroid. Remains of choroidal stroma and vessels in the defect. O. D. and retinal vascularization normal.

served in other parts of the background, including those interesting cases of coloboma of the macula (one of which I have observed and reported in *Knapp's Archives*, Vol. XI, No. 4) it would indeed be hard to account for them on the supposition of a non-closure of the cleft, unless the idea suggested by Pflüger be accepted that the eyeball rotates after the closure, of which there is not, otherwise, the least evidence.

Lindsay Johnson suggests that colobomata at the macula are due to navi of the choroid which disappear leaving the atrophic spot. In fact, it seems reasonable to suppose that the evolutionary forces, particularly those concerned in the nutritive supply, are interfered with, not necessarily by the failure of the cleft to close, but by some of the other numerous causes to which such inhibitions are attributed—prominent among which, no doubt, are disturbances in the vascular supply. That the vascular system generally has deviated largely from the normal is also shown in the peculiar order of vascularization of the retina, and other changes, particularly the smallness of the arteries and the tortuosity of the veins. That these interferences, however, are more liable to take place in the region of the invagination of the primary vesicle, where so many evolutionary forces must meet and harmonize, has been already admitted. It must also be apparent that the condition of these tissues under these circumstances would be such as to render them very liable to morbid processes, such as inflammation, or some retrogressive or misdirected activities.

That some of these processes are set up after the eye has attained something near its normal size and form is shown conclusively, I think, in the fundus picture of the right eye (Fig. 2). There can hardly be a doubt that in this case the optic nerve at the period of its full development occupied very nearly its normal position and that its scheme of vascularization approached that which we commonly see. Later, however, an intraocular pressure working on a tissue of low vitality and weak structure, pushed the nerve head and surrounding parts backward, dragging upon and separating its fibers, especially the upper ones, and disturbing the relations of its parts and its vascular system and bringing about the conditions as we see them now. It will be observed that the lower edge of the nerve head is still clearly limited and shows none of the appearances which we should expect to see in the so-called coloboma of the disc. From these appearances I believe that the larger part of the distortion of this eyeground is due to pressure on delicate or not fully developed tissue. In this way we can account for most, if not all, of the features of the so-called *coloboma of the optic nerve and optic nerve sheath*. Here again we are brought up against the commonly accepted explanation of defects in the nerve head and sheath by the non-closure

of the foetal cleft. The foetal cleft, however, does not affect the optic nerve development any more than it does the evolution and growth of the iris. The optic nerve is developed by offshoots from the retina after the mesodermal envelop has closed round the primary vesicle; and, while the nerve occupies the place of the optic stalk, the latter takes no part whatever in its development and the foetal cleft can affect it in no way. These defects in the nerve head have been found, too, affecting other parts than those in the direction of the foetal cleft. They are almost as frequent lateral as vertical and they differ in extent from an unusually large normal excavation to that we have pictured in Fig. 3. They are sometimes seen independent of any other anomaly in development of the background of the eye.

In brief, then, we do not see how coloboma in the eye tunics can be due essentially to failure of the foetal cleft to close; for, in neither the iris nor nerve is there, at any time, during their development a cleft or anything approaching it, and as for the choroid, the tissue from which it is developed (the mesoderm), is continuous over this region from the beginning. As, however, the region of the invagination of the primary optic vesicle is the meeting ground for several developmental forces, it is easy for a disturbance to occur in the harmony of their action, with an anomalous or defective process of some kind as a result. This, it would seem, is affected chiefly and primarily through some fault in the evolution of the vascular system. This arrested or defective development of the tissues renders them more liable to the influence of pressure and the inflammatory process, and it is to these two that we are to refer many of the appearances which form a part of the picture in nearly every case of coloboma, and of the choroid particularly.

ONSET OF ACUTE GLAUCOMA CHARACTERIZED
BY ENORMOUS CONJUNCTIVAL CHEMOSIS,
AND VERY RAPID FAILURE OF VISION.
IRIDECTOMY. RECOVERY OF SIGHT.

BY S. C. AYRES, M.D., CINCINNATI, OHIO.

SISTER A., aged 54 years, while engaged in conversation during the evening recreation hour, felt a sudden pain in her left eye. It seemed as if a strong blast of wind had been blown in her face, and almost immediately she could only see dimly the faces of those around her, while a moment before she could see clearly. The pain was sharp and severe and in a few moments she could see scarcely more than the motions of her hands. There began at once also a chemosis of the ocular conjunctiva.

I saw her the next day and the eye presented the following appearance: The cornea was steamy, the pupil widely dilated, and the ocular conjunctiva so chemotic that it stood like a rim around the corneal margin. Vision was reduced to counting fingers at 10". The tension was + 2 and the eye quite painful. So great was the chemosis that it was impossible to make an iridectomy, and hot fomentations and eserine were ordered.

The next day the eye was more comfortable and the pupil slightly under the influence of eserine; but vision not improved, and the chemosis was slightly better. Eserine and fomentations continued

On the next day the eye was better in all respects except the vision. The pain was less and the chemosis was subsiding.

On the following day—the fourth from the time of attack—the chemosis had sufficiently subsided so as to enable me to operate. A liberal iridectomy was then made upward. The wound healed kindly and recovery was prompt and satisfactory. Her vision is now as good as it was before the attack.

The fellow eye had a similar attack three years previously which was characterized by the same symptoms of chemosis and sudden blindness. It was successfully operated on by Dr Robert Sattler.

The particular interest in the case is the rapid development of chemosis attending the onset of the attack of acute glaucoma in both eyes. It resembled that of acute purulent conjunctivitis. It would have been impossible to have operated on her when I first saw her. The use of warm fomentations gave great comfort and the weak solution of eserine reduced the tension and produced some contraction of the pupil.

THE REASONS IN ONE STATE FOR A LAW
MAKING CREDE'S METHOD FOR THE
PREVENTION OF OPHTHALMIA OF
INFANCY OBLIGATORY TO
PUBLIC INSTITUTIONS.

BY LUCIEN HOWE, M.D., BUFFALO, N. Y.

AS A PAPER with a title very similar to this has recently been published in the "Transactions of the American Ophthalmological Society," there is naturally danger of repeating here much of what was said there. That paper, however, dealt with the question in the abstract. This takes as a concrete example the data on the subject obtainable in a single state, what the local evidence there, is in favor of the use of Credé's method, and on the other hand, how little attention is really paid to its use, especially in the country districts. In giving these data it is necessary to repeat, in the proper place, but very briefly, the results published by obstetricians of their experience with the Credé method. That part relates to the general aspect of the question. The rest, however, relates to the principal cause of blindness in New York State. Imperfect as this outline is, it indicates to what practical results such a study might lead, also in other states.

As to the number of blind in the State of New York, we know from the statistics of 1890 that the total then was 4,389.

We know, also, that purulent ophthalmia of infancy produces more blindness than any other cause, or indeed, than many causes combined. We know it sends about 21 per cent. of the pupils to the two schools for the blind on 34th Street in

New York and to the State School at Batavia. And we know that in general it produces nearly 11 per cent. of the blindness among persons of all ages; or, to be very moderate, counting it 10 per cent., we have in the State of New York 438 persons blind from ophthalmia of infancy.

It is important, also, to remember the cost of that disease to the State. Suppose that out of these 438 persons, 8 per cent. could support themselves—a number larger than the largest in any estimate—we still see the number to be supported is 403. As to the cost of these we have

For 64 pupils at the two schools mentioned	\$ 16,547.38
For 339 others, if all were paupers,	42,375.00
Or, for the 403 the yearly cost is over	58,622.00

Again, it is proper to notice how the blind population is distributed throughout the State, for the bearing of this point will appear later.

In order to show this at a glance, a map has been made, based on the figures given in the United States census report of 1890. The point which it emphasizes is that blindness is *less* frequent near the larger centers of population than it is in rural districts. Although this is contrary to what one might expect apparently the reason is not difficult to find. For, as ophthalmia of infancy is everywhere by far the most important factor in the production of blindness, and if, as it appears, less care is taken to guard against that in the country than in the city, it is natural to expect a larger number of children to develop that disease in the former than in the latter. Moreover, if this unusually large number of infected eyes in the country can not receive as prompt attention as they can in the cities where transportation is easy, physicians abundant, and dispensaries supra-abundant, then it is an additional reason for the existing distribution of the blind

Having thus glanced at the number made blind by this disease, how much they cost, and where they probably are, let us see what is the relative value of different methods of preventive treatment. It should be remembered that this is not a matter of opinion simply, but a question of recorded fact. A fact established by the combined experience of obstetricians. The best and the most recent tables of this combined experi-

ence of obstetricians in all parts of the world were published last year by Kostling, of Halle, in the *Archives für Gynäkologie*. This shows that in

- 17,767 births with no treatment, 9.2 per cent. had ophthalmia of infancy.
- 24,724 births with 2 per cent. solution of silver nitrate, 0.65 per cent.
- 1,223 births with 1 per cent. solution of silver nitrate, 2.4 per cent.
- 1,623 births with carbolic acid solutions, 7.7 per cent.
- 965 births with 0.1 per cent. of sublimate, 0.6 per cent.
- 1,396 births with other sublimate solutions, 0.4 per cent.
- 6,155 births with sterilized water, 2.8 per cent
- 701 births with iodide trichloride solutions, 1.2 per cent.

For this interesting table it is possible to give only two words of comment. One is to call attention to the fact that ophthalmia is about fifteen times less when silver nitrate is used than when nothing is used. The second comment concerns the apparent advantage of sublimate solutions. This advantage, however, is more apparent than real. The stronger solutions of sublimate proving very irritating to infants and several obstetricians like Fleischhauer, Olshausen and Widmark, after using the sublimate solutions, returned again to the silver nitrate.

Lest there should be any fear about using this, it is proper to answer briefly one or two possible objections to it. Some fear it may be dangerous. That is not so. In spite of the 24,000 cases here recorded, in spite of the efforts to find bad results from the use of silver nitrate which Cohen made by letters from one hundred and ten of the largest German clinics, in spite of the search of reported cases everywhere and which would surely have been reported, it is possible to find only four questionable cases. For two of these children drops were used. No one knows of what. For one (de Schweinitz' case) the solution was 4 per cent. in strength. Another (Pomeroy's case) the child was probably a so-called "bleeder."

Again, the method is not especially painful if cocaine is used first, as I have found on the blind eye of an adult, and especially is the discomfort not so great if we follow the suggestions of Dr. Alleman by using the fused silver nitrate for the solution.

This is the evidence of statistics. Let us come near home to ask what experience, not published, has taught obstetricians here as to the point in question.

About a year ago I wrote to most of the leading members of the New York Obstretical Society asking: "Should Credé's method be invariably used in public institutions, and should it be made obligatory there?"

Out of thirty-three replies received, twenty-eight answered the first question by "yes," and twenty-three answered the second question by "yes." The following have said that it should be made obligatory, namely: Drs. Boldt, Brettauer, Byrne, T. W. Cleaveland, Clement Cleaveland, Coe, Currier, Gibb, Emmett, Goffe, Jarman, Jacobi, Marx, McLean, Morrill, Mundé, A. M. Thomas, T. G. Thomas, Tucker, Tuttle, Vineberg, von Ramdohr, and Wiener. So it is evident as to what should be done.

Next let us inquire what is actually done. Comparatively little. In order to ascertain this, I have written to the principal hospitals and lying-in asylums and to the physician-in-charge of the alms-houses in the sixty counties.

An entire paper could be devoted to their answers. The points which concern us, however, are, first, that the leading obstreticians, especially in large cities, employ Credé's method almost without exception. In the alms-houses, however, it is almost invariably omitted. This has an instructive bearing on the may before referred to.

The foregoing facts show that the number of blind from this disease is large; that its cost is great; that the combined experience of obstreticians as published by observers in different parts of the world point, to one remedy as much better than any other thus far known. A remedy that is safe, easy of application, and if generally used, would greatly reduce the number of blind and consequent cost to the State. The statistics alone indicate the desirability of having that treatment made compulsory. In addition, however, there are other reasons not statistical in favor of such a law. There are:

1. That when the State assumes the care of a child by supporting it, the child becomes practically its ward, in that case the State, as the guardian, has the right to dictate what treatment shall be employed for the child, and if one method of treatment has been proved by vast experience to be superior to every form of treatment thus far known, then the State has the right to demand that any physician treating such a child shall use that form of treatment which insures the greatest amount of safety.

2. In the same manner it is not only the right but it is also the duty of the State to demand such treatment for pauper children, this being not simply for the sake of the child, but also to relieve the State from heavy, and to a great extent unnecessary, taxation.

3. The State has already established this principle of compelling physicians to follow certain procedures. not only by obliging them to report contagious diseases and imposing other duties upon them, but especially has it done so by the enforcement of vaccination. In this it has furnished a precedent for compelling physicians to use a certain method of treatment to prevent a certain disease.

It is true that a remedy better than silver nitrate may be discovered any time, but if this happened to-morrow the law could easily be amended. It has required nearly twenty years to accumulate the present evidence on this point, and while we wait for some other discovery, each year more children are made blind for lack of such legislation.

It is also true that such legislation would restrict the action of the few physicians employed by the State when they are attending the obstetric cases in alms-houses, but in view of the advantages certain to follow from this legislation, it is not probable that the medical profession would oppose such a saving and humanitarian effort when its real purpose is understood.

For it is simply a question as to whether a point of professional pride shall be maintained or whether by yielding that, there shall be each year a great saving to the State together with the rescuing of a few, perhaps a considerable number of children from life-long blindness.

The result of such a law would be :

First—That it would immediately tend to lessen the number of children thus affected.

Second—The indirect moral effect would be good in sustaining practitioners who do use this method in spite of ignorant objectors.

Third—The moral effect would be good in condemning obstetricians who neglect its use by such omission run greater risks of adding to the number of blind, nearly every one of whom, whether psupers or not, was educated at the expense of the State.

EXPERIENCES DURING THIRTY-EIGHT YEARS OF
OPHTHALMIC PRACTICE WITH LARGE PARACENTESIS OF THE SCLEROTIC WITH CILIOTOMY IN ACUTE GLAUCOMA (MR. HANCOCK'S METHOD).

BY S. POLLAK, M.D., ST. LOUIS, MO.

THE following is a plea for a mild, quick and effective surgical procedure for the relief of pain in acute glaucoma, and with a final outcome far more satisfactory, than has been heretofore attained. Thus, this short paper is presented with the object of recalling to the ophthalmic surgeons an operative method hitherto either not recognized or neglected by the profession and with the hope of eliciting a discussion thereon, advantageous to both the surgeon and patient.

It is not necessary to enter nosologically upon the symptomatology, pathogenesis and etiology of glaucoma, they are well known to every practitioner of medicine. The syndrome of glaucoma is so striking that it can be recognized at the first glance. All agree that the increased tension of the eye, by excess of secretion or diminished excretion, or both, is the chief if not the only cause of this most painful of eye diseases. To abstract the exudate, and re-establish the normal in- and outflow of the fluids, is the main if not the only object of treatment; but this can not be reached by any pharmaceutical remedy, and must, therefore, inevitably come into the domain of ophthalmic surgery. *Tapping* of the cornea, one or more times, with a broad paracentesis needle effects it in part, but only temporarily, for the withdrawal of the fluid contents of the eye is never complete, the punctures close too quickly for the normal opening of the natural drainage channels; the morbid hypersecretion commences again, and the tension becomes as great as ever, with all the attending consequences.

In 1856 the illustrious von Graefe announced a radical cure of glaucoma by means of a *large iridectomy*. The authority of that famous man was sufficient to attract universal attention, his opinion was law to the ophthalmic world. His advice was strictly and implicitly followed by oculists everywhere.

In the winter of 1859-60 I attended the clinics of von Graefe with absolute regularity, and saw a great deal of his work. I was charmed with and edified by the brilliancy of his eloquence, fervor and earnestness in his lectures, even more so than by his practical work. From Berlin I went to Paris, there von Graefe was not a great favorite, and his teaching was not accepted without protest. In Vienna von Graefe's precepts stood nearly as high as in Berlin, yet they were occasionally excepted to and varied from. It was in London where he exercised autocratic powers. At Moorfields—the greatest of all eye clinics—a large iridectomy in glaucoma was honestly performed, with the only difference, that a broad curved lance knife was used, instead of the narrow-bladed cataract knife of von Graefe. The entrance into the anterior chamber was made at the upper sclero-corneal junction.

In this most magnificent clinic, with a large staff of the most able ophthalmic surgeons and world-renowned medical scientists, such as Bowman, Critchett, Hutchinson, Hulke, Streetfeild and Bader, where clinical material was superabundant, furnishing cases for ophthalmic surgery of every kind and great variety, glaucoma was, perhaps, of more frequent occurrence than in the United States. Von Graefe's plan of treatment of glaucoma by large iridectomy was faithfully carried out but I did not have the opportunity of seeing the patients weeks after treatment.

From Moorfields I drifted daily to the eye clinic of Charing Cross Hospital, in charge of Mr. Hancock, as oculist-in-chief. I saw before me a very quiet, unassuming, unpretensions, but most courteous gentleman who went about his work quietly, without any eclat and without elocutionary display. He had three very able coadjutors, very well trained, to do all clinical work in prompt, precise and well-regulated manner. No time was wasted in vain verbose discussion. A diagnosis once made was promptly acted upon, according to well-established rules. A military precision prevailed every department of the clinic. When a case of acute glaucoma was brought up he simply addressed a few words to the numerous visitors, only stating that he assumed that they were familiar with the pathology of it, and with the therapeutic measures required. "We must reduce thoroughly the tension, and I propose to do it by a quick and effective method, and this is by a *large paracente-*

sis of the sclerotic with ciliotomy." His aids were prepared for that statement, and the operation was performed ere the patient was aware of what was to be done. Usually it was done while the patient was sitting up in a chair. Only the very nervous were allowed a recumbent position. This procedure was certainly quite different from one which I had seen done, perhaps, only a few hours before, at Moorefields, and struck me, and the others present, as greatly preferable and certainly more satisfactory.

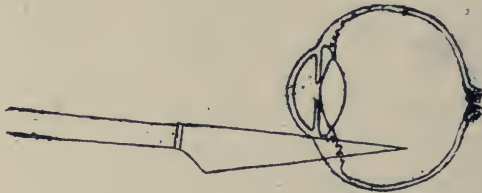
I will briefly describe and compare the two methods:

I. THE VON GRAEFE METHOD: LARGE IRIDECTOMY.—After deep anæsthesia with chloroform—cocaine was not known then—a speculum is placed into the palpebral fissure, the eye is fixed and kept immovable with a long-toothed ophthalmostat, an opening is made in the upper third of the sclero-corneal junction with a narrow-bladed cataract knife, in order to enter the anterior chamber, and pass through its entire width in order to make the counter puncture. This is, however, very difficult, and sometimes impracticable. The anterior chamber is apt to be very shallow, sometimes even entirely obliterated, the iris lying close to the cornea, the knife can not be passed between without wounding the iris, causing hæmorrhage and obscuring the field entirely. After the counter puncture has been made, corneotomy has to be completed by a to-and-fro or sawing motion of the knife held edge upwards, but this manœuvre causes a tugging on the fixation forceps and laceration of the conjunctiva. The iris is then seized with iridectomy forceps, is incised and at least one-fifth is *torn* off from its peripheral or ciliary attachment, and finally cut off. This is exceedingly painful as is shown by the flinching of the patient in spite of the deep anæsthesia. The anterior chamber is full of blood, which sometimes coagulates, and can only be cleared by absorption after many days. The eye is then bandaged and the patient put to bed. The fluid contents of the eye having escaped, the tension is reduced, and relief is given from pain. A goodly portion of the secreting surface has been removed, the resulting cicatrix being of very thin tissue, facilitates subsequent filtration; the laying bare of the zonula Zinii so near up to the ciliary insertion, improves also the interchange of fluids between the vitreous and aqueous humors, thus the recurrence of the glaucomatous features may be prevented.

But a cystic cicatrix is frequently the result, which is permanent in character and causes great irritation by the movements of the lids. Besides, the coloboma of the iris is perpetual, and so is the mutilation, marring the eye cosmetically and functionally.

Even in the skilled and dexterous hand of von Graefe at least twenty minutes are required for the performance of this most painful operation, and many weeks of most careful nursing, ere the final result can be ascertained.

2. HANCOCK'S METHOD: LARGE PARACENTESIS OF THE SCLEROTIC WITH CILIOTOMY.—No anæsthetic required on account of the celerity of the operation. The cornea being insensitive, a speculum is dispensed with. As the eye is usually turned up, fixation forceps are not needed. The lids are separated and kept open by the thumb and index finger which steady the eye at the same time. A Beer's knife held edge downward is thrust into the sclerotic at the lower margin of the cornea and carried slightly *downward* and backward into the vitreous to half the length of the knife, by which a large incision is made in the sclerotic, the ciliary muscle divided, and the vitreous body pierced. In withdrawing the knife, it is



almost imperceptibly turned to one side, thus making the wound gap, and giving an outlet to the entire fluid contents of the eye, and even to a little of the vitreous fluid. A few seconds only are required for this operation. No dressing or any after-treatment is needed. The relief from the increased tension and the pain is instantaneous. The lens recedes to its normal position, the pressure upon the ciliary processes is removed, the iris being freed from pressure soon resumes its normal place, the spaces of Fontana are gradually opened and so is also the canal of Schlemm. Drainage through the freed normal channels is now made possible and soon re-established. A small leakage through the wound can be kept up as long as

desirable, so that a return of increased tension is not likely to ensue. The eye retains its normal appearance, the pupil assumes its normal size. The turbid exudate having been entirely evacuated, the cornea and lens soon clear up, and vision, if not destroyed before the operation, is soon partially regained.

The Hancock method was well known as Moorfields, but was never alluded to or practiced. When I inquired of Mr. Critchett the reason for this, he tried to avoid an answer, and I did not press it. I knew that jealousy prevailed in the London Hospitals as much as elsewhere, but neither praise nor criticism was passed on each other.

On my return to the United States I opened an eye and ear clinic in the "St. Louis Mullanphy Hospital." The clinic soon grew in favor and developed into a very extensive charity. Clinical material was abundant and ophthalmic and aural work was carried on honestly and fairly, with a reasonable degree of success.

Chronic primary glaucoma was frequently seen, and treated therapeutically by constitutional means, such as mercurials, iodide of potassium, salicylate of soda, locally, by pilocarpine, and later by eserine, occasionally by local abstraction of blood, and finally by tapping the cornea.

The first five cases of *acute glaucoma* I iridectomized, but with unsatisfactory result, either to myself or patients. The procedure was slow, very difficult, and very painful, requiring always a protracted after-attendance, leaving a mutilated eye with poor and painful sight, or no sight at all. Such was the prestige established by von Graefe, that I had not the courage to give up the large iridectomy or deviate in any manner from the rules laid down by him; I became impressed with the fear lest, in case of my failure, I would not be sustained by the profession. But the unsatisfactory ending of the fifth case determined me to give up the von Graefe method and substitute that of Hancock's for it. It proved to be a happy and most fortunate resolve. In the *thirty-eight years* of my ophthalmic work *I have performed large paracentesis of the sclerotic with ciliotomy between sixty and seventy times without a single failure.* It gave immediate relief from pain, arrested effectually the progress of the disease, and I never met with a recurrence of it in a single instance. Many of the patients were seen weeks, months, even years after the operation; the cure was

found to have been radical and permanent. One patient came expressly all the way from New Mexico with a threatened acute glaucoma of *the second eye* four years after the other had been operated upon. Knowing what was coming, he lost no time and *demand*ed that the operation be performed forthwith, as his business required his constant presence. His demand was reasonable and *à propos*. It was promptly complied with. He left the city on the next train. I only heard from him several months later, by his sending another patient with a letter of introduction.

I have the clinical record of all the cases of acute glaucoma, which I have treated, by either the von Graefe or Hancock's method, in hospitals or private practice. They are occasionally enquired into by pension agents or pension commissioners. Some of these patients have called many years after, for optical treatment, but never for a recurrence of glaucoma. Below will be found a tabulated statements comparing the salient points of the two operations in my practice :

LARGE IRIDECTOMY.	LARGE PARACENTESIS OF SCLEROTIC WITH CILIOTOMY.
1. Deep anæsthesia needed.	No anæsthetic required.
2. Five or more instruments needed.	Only one instrument necessary.
3. Operation difficult, very painful.	Operation easy and almost painless.
4. Duration of operation 15-20 minutes.	Duration of operation 5-10 seconds.
5. Drainage effective but hæmorrhagic.	Drainage effective without hæmorrhage.
6. After-treatment, protracted.	No after-treatment at all.
7. Final result, mutilated eye, damaged in appearance and function.	Final result, no mutilation, appearance and function normal.
8. Recurrence rare.	Recurrence never.

I shall conclude this paper with a reference to the last case of acute glaucoma which came under my notice :

B. G., aged 35 years, a very decrepit, anæmic, prematurely aged woman, looking at least 50, presented herself on January 17, 1898, with the typical well pronounced symptoms of acute glaucoma of the right eye with turgescient tortuous blood vessels of the sclerotic, chemosed conjunctiva, hazy, smoky, insensitive cornea, dilated pupil, and a very shallow anterior chamber. The bulbus was of marble hardness with turbid media and opalescent lens; fundus not illuminable, and mere perception of light. She suffered excessive pain in the right eye, in

the temporal, supra-orbital and occipital regions, preventing sleep, and causing great general malaise. The irides of *both* eyes were tremulous, probably due to synchysis, or to ectopic dislocation of the lens.

An immediate operation was proposed, but refused.

Driven by the severe and continued pain, she returned to the clinic on January 20, ready and willing to submit to the proposed treatment.

In the presence and with the valuable assistance of my friend and associate, Dr. J. Ellis Jennings, and without much ado, and without an anæsthetic, except one drop of cocaine, a large paracentesis of the sclerotic with ciliotomy was performed in about ten seconds. The escape of aqueous and vitreous fluid was rapid and complete, followed by a total relief of pain and subsidence of all prominent symptoms of glaucoma. A very little absorbent cotton was loosely put upon the eye, without any bandage, and the patient sent to bed, to enjoy the quiet repose of the righteous and well.

Next day the pupil was smaller and the anterior chamber forming. The fundus not yet illuminable on account of a very slight hæmorrhage in the vitreous; no sight.

Third day, red reflex seen, with perception of light.

Fifth day, fundus seen, sight much better.

Seventh day, counts fingers at 20 feet, reads large print; anterior chamber fully formed, iris in its place, pupil yet a little dilated, tension normal. She feels well, with an eye in appearance and functions like its mate.

She was carefully examined by Drs. Alt and Jennings three weeks after the operation, who promised to add a few remarks on this wonderfully rapid and complete result.

It is my firm belief that acute glaucoma will be bereft of the terror it causes to the oculist and patient, by the Hancock plan of treatment, which is hoped will soon be adopted generally.

Thanks to Dr. Jennings, I am able to add a few lines of the literature on "Intra-Ocular Myotomy or Hyposcleral Cyclotomy."

This operation was performed on the supposition that spasm of the ciliary muscle causes a stasis in the intra-ocular blood circulation.

It was performed by Hancock in 1860, Heiberg in 1862, Pritchard in 1871, and Detowski in 1872.

Hancock inserted Beer's knife at the outer lower scleral border and passed it down and back till the sclera showed a 3 mm. section; or after inserting it at the limbus and through the angle of the anterior chamber, the muscle was cut with the lens on one side and the sclera on the other side of the knife.

Autopsies showed that many of these incisions had divided a part of the muscles.

But there is a sequel to the above case. On February 15 B. G. called again at the clinic stating, that on rising the day before she perceived that the right eye was sightless and painful, which was unfortunately too true, but readily accounted for. As stated before that there is and always was a tremulous iris in both eyes, in the left even more so than in the right. This was attributed to *synchysis* and probably to *partially dislocated lenses*, which, however, was not made out by ophthalmoscopic examination. But at present there is a *complete dislocation of the lens into the anterior chamber of the right eye*, causing much pain in the ciliary region and considerable increase of tension. The lens is opalescent, though it was clear the day before. She met with no injury of the eye which could have caused a rupture of the suspensory ligament and a consequent displacement of the lens. It is clear that the *partial dislocation* of the lens, which has existed so long, has now *developed* into a *complete dislocation* in the right eye, as is now very manifest, and has doubtless caused the present aggravated condition. It is also more than probable, that the long existing partial dislocation of the lens may have been the initial cause of the glaucoma. According to Mr. Bowman this is due to the pressure of the lens upon the iris, which sets up irritation and a hypersecretion of fluid within the eye.

The exigencies of the case were such, that the lens had to be removed. She returned on the 17th for that purpose. The lens was transfixed with a cataract needle, a lower one-third section of the cornea was made with Beer's knife and finished with a conjunctival flap. With a Waldau scoop fragments of the lens were drawn out, until the pupil became clear and she counted fingers. The corneal wound was carefully closed, the conjunctival flap was smoothly adjusted over it, a few drops of eserine instilled, the lids closed, and a pledget of a few layers of aseptic gauze laid over them and fastened with a few strips of isinglass plaster. She was sent to bed, is entirely free from pain, slept good, and is in the best of spirits.

A FEW WORDS IN ADDITION TO DR. POLLAK'S
PAPER.

BY ADOLF ALT, M.D., ST. LOUIS, MO.

ON FEBRUARY 8, by the kindness of Dr. S. Pollak, I had an opportunity to examine the eye of B. G., operated by him after Hancock's method some days previously. At his instance I wish shortly to state the conditions found.

The right eye showed no injection. There was a semi-transparent linear scar beginning at the corneo-scleral margin of the lower inner quadrant and running down in the sclerotic for about 5 mm. on the nasal side of the inferior rectus. The anterior chamber was fairly deep. Iridodonesis was well marked (in both eyes) Tn.

The ophthalmoscope showed numerous floating opacities. In the neighborhood of the macula lutea were two glistening white spots without a pigment rim, between them some signs of former choroiditis. (In the fellow eye a similar condition existed). The optic nerve and blood vessels were normal. Vision in R. E., $\frac{5}{60}$, with + 6 D., $\frac{20}{LXX}$.

On February 15, I again saw the patient, with total dislocation of the lens into the anterior chamber.

It seems to me evident, that the defects in the choroid and zonule of Zinn were congenital. The glaucoma in this case, although acute, was a secondary glaucoma. In fact, the patient stated, that the attack for which she had been operated on had started exactly in the same manner by dislocation of the lens into the anterior chamber.

Nevertheless, the operation after Hancock's manner had undoubtedly done all that Dr. Pollak claims for it, relieved the acute attack and the pain accompanying it, had led to restoration of a fairly deep anterior chamber, and $\frac{20}{LXX}$ of vision.

Whether this method can be applied with equal success in all cases of acute glaucoma, is a question which, it seems to me, time has already decided. While iridectomy to this day is practiced by almost all surgeons, Hancock's operation is forgotten by most of the older operators and unknown to the younger ones. Whether it will be worth while to revive it, the future will, perhaps, show.

ADDITIONAL NOTES ON A CASE OF HIGH MIXED ASTIGMATISM.

BY B. L. MILLIKIN, M.D., CLEVELAND, OHIO,

PROFESSOR OF OPHTHALMOLOGY, WESTERN RESERVE UNIVERSITY, — OPHTHALMIC SURGEON TO LAKESIDE HOSPITAL, — CONSULTING OPHTHALMOLOGIST TO CHARITY HOSPITAL, CLEVELAND, OHIO.

IN THE "Transactions of the American Ophthalmological Society, Vol. VI, page 582, I have reported in detail the history of a case of very high mixed astigmatism, the correction at that time being as follows:

O. D., — 10.00 D. cy. ax. 90° \subset + 7.00 D. cy. ax. 180° .

O. S., — 6.00 D. cy. ax. 100° \subset + 4.00 D. cy. ax. 10° .

These glasses were prescribed in 1891. Since then the patient, who is a book-keeper, had worn the glasses steadily until December, 1896. For six months before this time, however, he had complained of some blurring, both for distant and for close use of the eyes.

Examination on December 7, 1897, gave the following results: With his old glasses his vision was $\frac{6}{XVIII}$ in each eye. A fresh examination of his refraction developed the following requirements in the way of glasses:

O. D., — 13.00 D. cy. ax. 95° \subset + 7.00 D. cy. ax. 5° .

O. S., — 8.50 D. cy. ax. 100° \subset + 5.00 D. cy. ax. 10° .

These glasses were prescribed for distant use. One week later, when his glasses were ready, it was found that his vision with the right eye was $\frac{6}{IX}$ full, and with the left $\frac{6}{VI}$. In testing his near vision it was found at this time that he was somewhat presbyopic. With + 2.00 D. added to each eye he was able to read perfectly well at 14 to 15 inches, and these glasses were ordered for close use over the distant ones.

Since then the patient has made no report, so that I have no doubt he is using them for all sorts of work with comfort.

An examination of the eye-grounds, with the glasses on, showed the fundus of each eye in very good condition, with no evidence of any marked disease. In fact, there had been practically no change in the eye-grounds since the primary examination in 1891.

It will be observed that in the glasses the increase of the

myopic portion of the right eye had been from 10.00 D. to 13.00 D., with no change in the hypermetropic cylinder, as compared with the previous examination in 1891, while in the left eye there had been an increase from 6.00 D. to 8.50 D. in the myopic cylinder, and an increase from 4.00 D. to 5.00 D. in the hypermetropic cylinder, a difference in the right eye of 3.00 D., and a difference in the left of 3.50 D. in a period of five years. It will be seen, therefore, that the total astigmatism reaches the very high amount of 20.00 D. in the right eye and 13.50 D. in the left, with practically normal vision. It will also be observed that the angles of the astigmatism are all against the rule.

Thus far I have been unable to find any case of so high a degree of astigmatism with practically normal vision and the ability to use the eyes for all sorts of close work without discomfort.

CORRESPONDENCE.

INVITATION TO A SUBSCRIPTION FOR A MEMORIAL TO OTTO BECKER.

VIENNA AND ERLANGEN, February, 1898.

OTTO BECKER unfortunately did not reach a great age. When he was 62 years old, possessed of good health and mental vivacity, filled with the desire to serve science, educate pupils and to help suffering humanity, an insidious disease attacked him and tore him from our midst in a few weeks.

His name will remain unforgotten in ophthalmology. Yet, as his 70th birthday anniversary is approaching, we desire to celebrate his memory by a visible and lasting token.

In the Domhof at Ratzeburg there stands the small house in which Becker was born. We wish to ornament this with a memorial tablet. At the same time we want to place the bust

of the master in the place where he worked for almost twenty-five years, in the beautiful eye clinic at Heidelberg, which owes to him its origin, to his organizing talent its excellent arrangement, and to his prominence its name and fame.

We have placed the execution of a life-size bronze bust into the hands of the well-known artist, Professor Koenig, at Vienna. It will probably be finished by July of this year.

We confidently address all pupils, friends and colleagues of Otto Becker, all members of the ophthalmological society of which he was so long an honored member, being satisfied that every one will gladly, according to his means, help us in this work of gratitude.

Contributions to be sent to

DR. ST. BERNHEIMER, Vienna, IX, Guentherstr. 3,
Or, PROF. O. EVERSBUSCH, Erlangen, Glueckstr. 10,
The Committee.

While the editor of this Journal does in no way wish to detract from the praise which so deservedly was and is still heaped on Otto Becker, and hopes that the American colleagues will gladly respond to the request, he nevertheless, having been a pupil of both, thinks it no more than just to remind the Committee that in order to honor the dead, the living should not be robbed of his due. It was Hermann Knapp, now of New York, who founded the eye clinic at Heidelberg, and who had brought it to name and fame without Government aid, while Otto Becker was still an assistant at Vienna. It is sometimes well to see to it that history is not turned into legend too soon. When Becker came to Heidelberg in 1869, Knapp's clinic was bought by the Government and turned over to him a ready-made, well-arranged and deservedly renowned clinic, the creation of the untiring energy, scientific worth and practical accomplishments of Herman Knapp.

ALT.

THE AMERICAN JOURNAL OF
OPHTHALMOLOGY.

VOL. XV.

APRIL, 1898.

NO. 4.

ORIGINAL ARTICLES.

RECENT RESEARCHES INTO THE HISTO-
PATHOLOGY OF TRACHOMA.¹

BY ADOLF ALT, M.D., ST. LOUIS, MO.

AMONG the many hitherto unfathomed eye diseases which repeatedly have been the subject of the ardent labor and ceaseless research of almost every worker in the field of histo-pathology of the eye, trachoma takes one of the foremost places.

Its frequency as well as its important position among the diseases of the eye, which is enhanced by its deleterious sequels, must needs again and again arouse the desire to fathom its real cause and, perhaps, in this way to help in its prevention or cure.

My own researches in this direction date as far back as 1876, when I inoculated rabbits' eyes with trachoma. I was perfectly successful in producing a disease which apparently differed in no way from the real trachoma. However, this disappeared again under my eyes in the course of from one to two weeks. I have some of the old specimens still and what I had succeeded in producing in the rabbit's conjunctiva differs

¹Read before the Third Annual Meeting of the Western Ophthalmological and Oto-Laryngological Association, held at Chicago, Ill., April 7-8, 1898

histologically in no way from the disease in the human conjunctiva. Leber has had the same experience.

After a lapse of years I again took up the study of this subject on quite a considerable amount of material which I gained by excising trachoma granules and cutting them into sections. All I learned in this way, however, by studying sections only and without the finer staining methods of more modern times, was, that the trachoma granule must be looked upon as a miliary lymphoma of the conjunctiva. (See AMERICAN JOURNAL OF OPHTHALMOLOGY, Vol. III, No. 6, page 161). Later on, when persuing bacteriological studies, I again took up this subject with a view to finding the microbes which had been described by Koch, Sattler, and others, as the specific causes of this disease. Like others, however, I have been unable to find them. It seems, that, although microbes may cause the disease, the present means are not sufficient to detect them and to this day researches in this direction have proven fruitless.

About a year ago, being made somewhat familiar with the modern methods of blood examination by differential staining by my friend, Dr. L. Bremer, the idea struck me that the same method of smearing out the fresh trachoma granules like the blood specimens might, perhaps, enable me to learn something more than sections of the hardened material had been able to teach me. This method, indeed, offers immense advantages over any other. I can not find any indication that others have used this same method, and while I neither claim any priority nor want to appropriate to myself what others may have seen, nor feel that my researches have been brought to a satisfactory conclusion, I thought it might interest you to hear and see what I have been able to find. I further want to state right here, that I made these researches before being acquainted with those of Leber (Report of the Heidelberg Ophthalmological Society for 1896, p. 156) which were not yet published, nor with those of Vilard (*Archives d'Ophthalmologie*, May and June, 1896) which latter had in some way escaped my notice. The results I wish to detail, are, therefore, absolutely original with me, although I now know, that these two authors have reached similar results, however, by, as far as I know, different methods of examination. In this, then, our separate and independent labors support each other.

I shall, in the following, first detail my own methods and

results and then compare them with those of others. I have, in the course of about a year, for this purpose, squeezed out every trachoma granule and many follicles in follicular conjunctivitis which came under my observation, whether they lay superficially, or, as in old cases, buried in the depth of the tissue. This fresh material I smeared out between two slides and allowed it to dry in the air. Some of these slides I then stained without any further procedure. Some I hardened in formol, some in alcohol, some in alcohol and ether, some in boiling

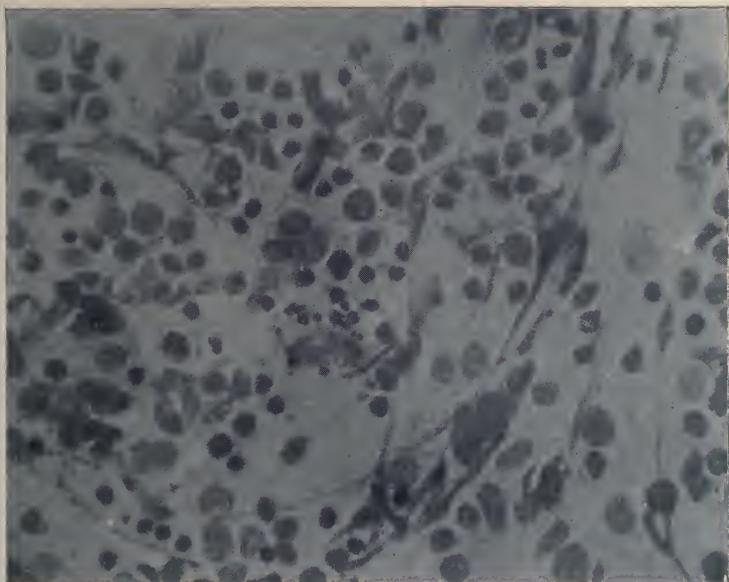


FIG. 1.

alcohol and ether, and another larger series I heated to from 120 to 140° after the method of Ehrlich; most of them I simply drew a few times through an alcohol flame before staining. The results did not seem to be materially altered by these different methods. As staining materials I have used a great variety of aniline dyes, hæmatoxyline and eosine. The best staining I obtained by the differential stains composed of several colors. Among these Dr. L. Bremer's methylene-blue-eosine mixture (Limbeck, *Klin. Pathologie des Blutes*, 1896, p. 26, and *Centblt. f. Med. Wissenschaften*, 1894, No. 49) which I

was in the fortunate position to receive from the inventor himself, easily holds the first place. Staining by Aldehoff's method (Limbeck, page 22) and with hæmatoxyline and eosine come next. For certain purposes, especially for photographing, Bismark-brown is, perhaps, the best stain. (See Fig. 1).

The first impression gained when examining such a specimen is indeed bewildering. There seems to be a perfect chaos of threads and round cells. At first I was decidedly struck by the threads which take up the staining material like nuclei which undergo a regressive metamorphosis. It soon became

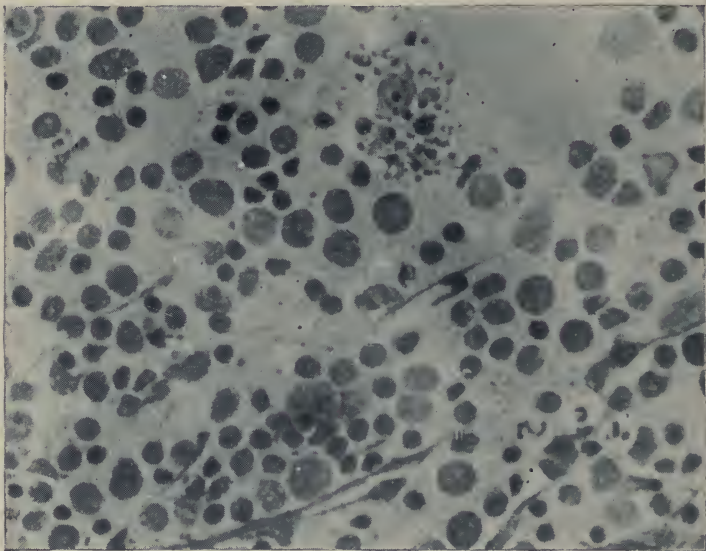


FIG. 2.

apparent that many of these threads are connected at one end with large bodies which are frequently larger and some even considerably larger than the nuclei of the epithelial cells of the conjunctiva. These bodies vary extremely in form, some being round, some oval, some spindle-, pear-, or club-shaped, while others again have totally irregular outlines. The larger, however, they are the less of the staining material they take up. The more diaphanous, sago-like the granule, the more of these threads and bodies, either attached to them or lying loosely around, are found. I venture the opinion that in this material we have to deal with nuclei having undergone a mu-

roid degeneration. To be sure, no longer can there any nucleus or nucleus-like substance be demonstrated within them. They are perfectly homogeneous or they show a fine granulation, some contain vacuoles. (See Fig. 2).

Next to these threads my attention was attracted by a large number of round or oval cells of varying size, sometimes quite small, sometimes as large and larger than the nuclei of the epithelial cells of the conjunctiva, in which single aniline dyes and thionin, made visible one, two, three, sometimes even four small, eccentrically situated, round bodies, like nucleoli. Their similarity to nuclei deprived of protoplasm was

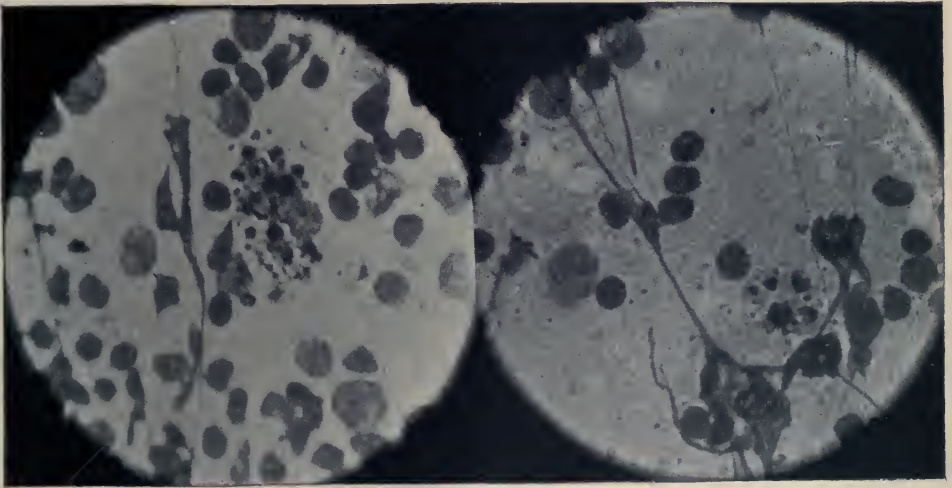


FIG. 3.

so great that I looked upon them as the remains of destroyed epithelial cells. Then, I thought that they might, perhaps, be a vegetable parasite similar to the yeast-plant. Comparison with this plant, however, showed at once, that the idea was erroneous. Whenever I stained specimens differentially with two dyes, such cells did not appear. I must, therefore, assume, that their true nature is not revealed by the single staining.

Double stains make it plain that the vast majority of the round cells composing the granule are lymphocytes. Their protoplasm usually forms but a small ring, often with a slight thickening at one pole, around a large nucleus which stains

much lighter and which seems to be, therefore, undergoing a regressive metamorphosis. Between these lymphocytes lie a varying number of mononuclear leukocytes, but frequently, also, leukocytes with a polymorphous nucleus, which is often seen to be divided into three, four and five portions. Though nothing unusual, I mention this fact for reasons which will appear later on. Cells showing karyokinesis are not wanting, but rare.

Whatever stain is used, the observer must be struck by the very different amount of stain the different cells of which the granule is composed, take up. Especially with Bismark-brown and with hæmatoxyline, is this apparent. With hæmatoxyline and eosine a large number of cells is especially deeply stained in such a manner that an oval or round dark-blue nucleus is seen with but a small amount of red protoplasm at one pole, sometimes protruding tongue-like for some distance. Such cells also vary extremely as to size. (See Fig. 3).

When following up these curious deeply stained cell forms and searching for their origin, I came upon an immense cell with a large, pale nucleus, in the protoplasm of which were embedded smaller and larger bodies which were in part very deeply stained. While these bodies seemed sometimes to simply lie embedded in the granular protoplasm of such a cell, in others they were surrounded by a clear space. In other similar cells clear spaces seemed to indicate where such bodies had formerly been enclosed. Since my attention was first drawn to these peculiar cells, I have never missed them and I am satisfied that they are more frequent in recent than in older granules. While they are in some specimens rarer, in others they are extremely numerous.

The bodies embedded in these cells appear with some stains like round bodies with a piece eaten out, while with other stains it becomes clear that they are mostly spherical, or nearly so, but that only a smaller or larger portion of them, which is sometimes semi lunar or band-like in shape, sometimes round like a nucleus, takes on a deep stain, while the remainder is much more lightly colored. Sometimes there are but a few such bodies in such a cell, sometimes their number is so great as to make it impossible to count them. Frequently larger deeply stained round bodies are seen lying close to this large cell and by their whole

appearance give the impression that they are just such bodies which have grown larger and are in the act of leaving or have left their former abode. Sometimes I have found only a mass of such bodies lying together near a very pale large nucleus, the protoplasm enclosing them had evidently disappeared. (See Fig. 4).

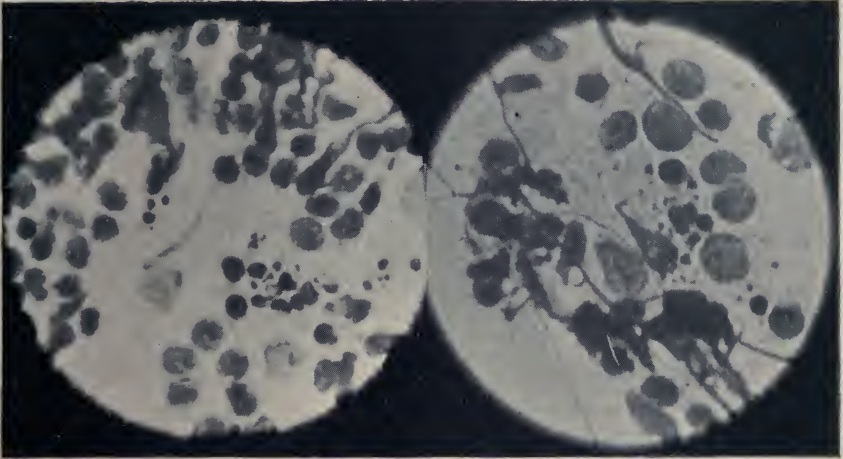


FIG. 4.

The idea that these cells are a transformation of leukocytes, I gave up almost as soon as I conceived it, because there were no connecting links. I know that similar cells have been described by Hoyer in lymphatic glands, but I do not know whether they are identical. The more I have studied these bodies the more I am impressed with the fact, that they must play an important rôle in the histology of trachoma. The more I searched for them and their derivatives between the other round cells of the granule, the more cellular forms I found, which I think are such bodies enlarged and, I believe, that the cells with the small amount of protoplasm lying only at the pole, mentioned before, are the oldest forms of these bodies. (See Fig. 5).

It is, of course, impossible to prove it, yet, I am of the opinion, that it is not at all unlikely that in these bodies we may have to deal with an organism which is the cause of the trachoma granule. That they play an important rôle in its

formation can, I think, not be doubted. I think, they are the trachoma parasite.

What, however, these enormous cells are in which they are at first embedded and where these come from, is a question which is not easily settled. These cells and their nucleus resemble epithelial cells most, but I have not found any cell containing these bodies, so far, which was undoubtedly an epithelial cell, neither have I found them more than once or twice in the scraped off epithelium. (See Fig. 6).



FIG. 5.

Aside from the larger round cells, the cells containing these strange bodies, and the cells and nuclei which are evidently undergoing mucoid degeneration, there are innumerable very small round and oval bodies everywhere, some of which take up the stains but very slightly, while others stain darkly, and which are, perhaps, to be looked upon as cell detritus.

I wish to state here, that contrary to other observers, I have never seen any reticulum, nor any connective tissue fibres or cells between the round cells of which the granule is composed. Another strange fact is, that although I have a number of injected specimens, which show that the trachoma granules are pervaded by numerous blood vessels, and although I have in

many a fresh specimen, put on the slide without any pressure, seen undoubted channels filled with blood—in none of these smear specimens have I come across any tissue which could be claimed as that of blood vessel walls. Yet, every specimen contains many erythrocytes. It is, therefore, probable, that, as it is known to be the case in sarcomata, the blood in the granules is not contained in distinct blood vessel walls, but rather circulates in clefts in the tissue without other walls than the cells of the granule themselves.

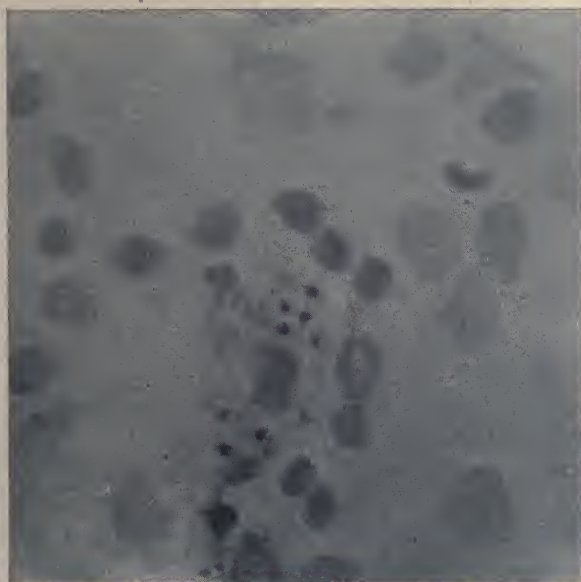


FIG. 6.

So much I wish to relate concerning my own observations.

Villard, who seems to have studied the histology of the trachoma granule by means of sections of the hardened material only (*Archives d'Ophthalmologie*, 1890, May) finds in the granules very delicate connective tissue trabeculæ, lymphocytes, leukocytes, large cells the nature of which he does not know, and phagocytes. His phagocytes, from his description and drawing, correspond undoubtedly to the large cells containing the strange bodies, which I have just illustrated. His idea I think is absolutely fallacious. From what I stated be-

fore, the bodies contained in these cells from their general appearance, form and the deep stain, can not possibly be taken for pieces of nucleoli or protoplasm. Nor is it, I think, possible to think of the process of phagocytosis after having seen some of these cells in which, from the large number of enclosed bodies, hardly any protoplasm, besides the nucleus, is visible. Of course, this is not so apparent in sections of the hardened granule, while it is easily seen in the smear specimen. If there is any phagocytosis, I believe it is in the reverse direction. I think these bodies grow within and eat up, so to speak, the cell that harbors them and then wander away.

Leber (Report of the Heidelberg Ophthalmological Society for 1896) has also given especial attention to these large cells containing strange bodies. He, also, does not believe that they can be phagocytes. In want of a better descriptive name he calls them "Körperchencellen" (corpuscle cells), and he states that he, too, never missed them. He describes the form of what he calls the nuclei of these bodies as hood-like, and also states that the bodies are spherical, although a part of the sphere takes up but little stain. He has also thought of the possibility of a parasitic nature concerning these bodies, but has discarded it, because he saw similar bodies in the lymph follicles of the rabbit's conjunctiva. Leber describes further a number of larger cells with one nucleus, which are remarkable for the deep stain. I suppose, they are the cells which I take to be the oldest bodies wandered from their original home. Then, he mentions crescent-shaped cells which, as he states, are always so situated, that their concavity looks towards the surface of the conjunctiva. Since he seems to have studied the tissue of the granules in sections chiefly or only, it is not astonishing that I have in my method of research not seen everything as he did and I have never come across such cells.

At the Twelfth International Congress in Moskow last summer, A. Petersen read a paper containing "Contributions to the Pathological histology of the Conjunctiva" (*Centralblatt für Augenheilkunde*, November, 1897). In this he at great length describes club- and spindle-shaped bodies and long threads, which take up all the nuclear stains. He studied these in sections and by pressing a fresh specimen on the slide gently with the cover glass. In this manner he sometimes succeeded in isolating the threads and in seeing that a great many of them

were connected with these club-, pear- or spindle-shaped bodies, which formed enlargements at one of the thread's ends. He particularly militates against the idea that these many-shaped bodies are leukocytes, which have obtained their peculiar shapes while wandering and squeezing through between the cells of the granule and its epithelial cover. He finds them, moreover, in all chronic diseases of the conjunctiva. From this description, although no drawing accompanies this paper, I can hardly doubt, but that the author here refers to the threads with enlargements at one end, of which I have spoken in the beginning of my description and which I consider to be the result of a mucoid degeneration of cells and nuclei.

There is one more paper which I want to refer to,—“On Plasmodia in Trachoma” (Plasmodienbefunde bei Trachoma), K. Elze (*Berlin, Gebr. Bornträger, 1897*). From the similarity of the climatological conditions under which malaria and trachoma seem best to thrive, Elze, like many another before him, drew the conclusion, that the same or a similar cause must bring about both these diseases. He observed, *in one case*, in the secretion, as well as in the granules, certain formations, which he thinks are monads and which he especially likens to the *Trichomonas Batrachorum* and proposes to call plasmodia. He is the more convinced of the correctness of his view, since he has found that quinine will cure trachoma. I am afraid that the preconceived idea helped the author along in the results of his research and its somewhat phantastic description. His drawings surely are far from convincing, neither have I been able to verify his results by employing his own method of observation.

Finally, I want to state here, that notwithstanding all clinical difference between the so-called follicular conjunctivitis and trachoma, all that I have described in the foregoing applies as well to follicular conjunctivitis as to trachoma. Particularly, the bodies which I consider to be parasites, I have always found in follicular conjunctivitis.

THE ANTISEPTIC PREPARATION OF THE CON-
JUNCTIVA FOR CUTTING OPERATIONS
ON THE EYEBALL.¹

BY B. E. FRYER, M.D., KANSAS CITY, MO.

AT a comparatively recent meeting of one of the foreign medical societies, the matter of ocular antisepsis being under discussion, the remarks of a number of ophthalmologists convinced me that many of those who spoke on the subject understood but little of bacteria or of the effects of supposed bacteria destroyers, and it occurred to me that a consideration of this important matter might well be had here.

The terms antisepsis and asepsis are rather carelessly interchanged by many practitioners and this ought not to be. I would insist, that in most instances surgeons do not—nay, can not make a surface aseptic if we would strictly include in the word asepsis, not alone an absence of septic material, but also an absence of the cause of sepsis, viz., all pathogenic bacteria. And I propose to show how and why this is true.

It is true, as can be shown, however, that by the antiseptic measures the surgeon takes, he may render the microbes attenuate, which remain so after the washing and scouring with various soaps and afterwards with ether and following this with sublimate and other solutions, but that some of them still remain in the sub-epithelia as has been proved by Welch, of Johns Hopkins University. I am now, of course, referring to general surgery and general surfaces and not those of the eye. Welch found, be it remembered, that on scraping a surface which had been rendered aseptic (in the generally accepted sense), and on placing these epithelial cells in the culture tube no growth followed; but if the antiseptic used were precipitated, that then there was microbic growth and nearly as much as if no antiseptic had been applied. In other words the antiseptic application had produced, not death of the microbe, but an inertia or restrained condition, and that these microbes were

¹Read before the Third Annual Meeting of the Western Ophthalmological and Oto-Laryngological Association, held at Chicago, Ill., April 7-8, 1898.

still upon and beneath the superficial epithelial layers. Welch's experiments were made with bichloride of mercury solutions, and the salt was thrown down by ammonium sulphide.

It is well understood, of course, that in antiseptic work on the conjunctiva we can use only very weak solutions of sublimate or of iodide of mercury, and Sternberg states that pus cocci are restrained in their development by 1 : 30000 of these salts.

I believe, in fact I know, that a mercuric chloride solution in the proportion of 1 to 6000 can be instilled in the conjunctival sac every day for weeks without any reaction being produced.

The method of preparing an eye for a cutting operation upon it which I employ is as follows: The face is thoroughly cleansed with soap and water and then the orbital region is washed carefully with a carbolic acid solution, 1 : 50. The eyelids and eyelashes at their roots are especially cleansed. The conjunctival sac is then flushed carefully with 1 : 6000 sublimate solution and a bichloride gauze pad is put over and retained upon the eyelids. This should extend over the brow and nose and down upon the temple and cheek. The dressing is changed daily, and daily the eyelids, brow and cheek are washed with carbolic acid solution and the gauze renewed. Latterly, in the beginning of the antiseptic preparation, I have instilled protargol solution (1 per cent.), say for four or five days, and at the end of that time dropped in the mercuric chloride solution. I find in certain cases, especially in those patients who, from having prostatic trouble, and who void more or less pus with their urine, are liable to infect the eye or have infected it, that the protargol seems to stop the pus flow from the conjunctival sac readily and also removes the conjunctival congestion. These prostatic cases require greater care in preparation for eye operations than is usually given them even by those who are believers in correct antiseptics; many of the cases have pus cocci in their conjunctivæ which cocci, while they have only an innocent surface lodgment, will, however, produce purulent destruction of an eye if admitted unrestrained into the globe. The protargol does admirable work in this class of cases early in the antiseptic preparation. I carry on daily the antiseptic applications and dressings until no yellow discharge is found either at the canthi, on the lid mar-

gins, or on the antiseptic gauze. This may take many days, but the delay is compensated for by the reduction of risk of infection at the time of any cutting operation on the eye. Of course there are circumstances which may preclude any delay and demand an immediate operative measure; under such conditions we must do the best we can by the thorough flushings of the conjunctival sac with the appropriate germicide. Operations for glaucoma permit, of course, no delay, but most cataract extractions do. At the time of operation, after the last drop of sterile cocaine is instilled, a final flushing of sublimate is done and the operative measure follows at once.

I am well aware that there is nothing new in this method—I simply claim that the prolonged preparation is new and is based on facts well known to bacteriologists. I believe we can by following this method restrain the pathogenic microbes in *the conjunctiva* as they are restrained in *the derma*, and sufficiently long to allow of healing before the restraint is removed by the germicide's final removal or elimination.

I have microscopically demonstrated streptococci from the conjunctivæ of eyes which were to be operated and in which streptococci were so attenuated in power by the continued antiseptic preparation that no bad result followed the operation.

Of course the condition of the nares must be looked after and I have found that a weak solution of iodine tincture in alcohol used as a spray does good work in attenuating microbes in the nasal cavities.

I need say nothing of the instruments; there is very little difference of opinion as to the methods of their sterilization. I might add that the use of boric acid in antiseptic preparations anywhere is but lost time, it is not a germicide, and it is not even a microbic restrainer.

I had planned a number of experiments both on the human conjunctiva and in those of animals, but a severe illness, lasting several months, interfered. I propose, however, in the near future a complete series of experimental research, both as to the attenuation of microbes in the conjunctiva by weak solutions of sublimate, as to how long the attenuation will last in healthy human and animal conjunctivæ, and further, how long afterward the mercuric chloride remains permeate in and among the epithelia after instillations. We know, of course,

that silver nitrate when applied to the lids for a long period produces a permanent deposit in the epithelial cells, which deposit is reproduced as each cell is reproduced.

ROTATION OF AXIS OF ASTIGMATISM DURING OPHTHALMOMETRIC EXAMINATION.¹

BY L. R. CULBERTSON, M.D., ZANESVILLE, OHIO,

OCULIST TO U. S. PENSION BUREAU; C. & M. V.; B. Z. & C. RYS.; CITY HOSPITAL, ETC.

THE alteration of the axis of astigmatism when binocular vision is in convergence has been termed "binocular astigmatism" by my father, the late Howard Culbertson, M.D. (See article, "Binocular Astigmatism," by H. Culbertson, in *AMERICAN JOURNAL OF OPHTHALMOLOGY*, June, 1888, also the *Transactions of the American Medical Association*, 1888).

In using the Javal-Schiötz ophthalmometer (model 1889), I have noticed a number of times that while the patient was fixing his gaze on the tube the ball seemed to rotate slightly from the vertical, either to the right or left, and then fix and remain stationary. As soon as it became stationary I would give the axis thus found. I did not pay much attention to the cause of this until examining two unusual cases.

CASE I.—Mrs. A. L., aged 42 years. I did not test the muscle balance, but examined with Javal astigmometer. I had examined her eyes two years ago and found the axes of astigmatism to be 90° , and she had been wearing sphero-cylinders constantly with axes 90° . She now complains that her eyes hurt. I re-examined her with the Javal astigmometer. I took care that her head was level (and remained so) and that the other eye was covered by the ordinary shade. Upon first looking at each eye the axis of each was 90° . As she looked longer at the tube the axis of the right changed to 85° —that is, the upper end of the plane swung in 5° —while the left eye

¹Read before the Third Annual Meeting of the Western Ophthalmological and Oto-Laryngological Association, held at Chicago, Ill., April 7-8, 1898.

changed to 95° (that is the vertical plane swung in 5°). This was probably due to the action of the superior obliques, or to a weakness of the inferior obliques. After repeated trials with the shade and without shade over one eye the eyes invariably fixed at 85° and 95° , respectively. On placing correction before each eye and with both together, vision was best with axes at 85° and 95° . Correction given was

R. E., +8. D. sp. \ominus —2. D. cyl. ax. $175^\circ = \frac{5}{XX}$;

L. E., +5. D. sp. \ominus —75 D. cyl. ax. $5^\circ = \frac{5}{IX}$. V. $2 = \frac{5}{VIII}$.

She has been wearing these glasses several months and makes no complaint.

CASE 2.—Mr. J. G. F., aged 60 years Was operated on both eyes several months ago for glaucoma, also, has incipient cataracts. The head was placed squarely on the chin and the forehead rests, and a shade put over the left eye. On first adjusting the instrument the axis was $+6.5$ at 90° , but gradually the ball rotated on its vertical plane outward 15° making axis 105° . While the other eye rotated out to 75° , the same results were obtained with both eyes uncovered during examination. On making remote vision test

R. E., +6. cyl. ax. 30° (!) V. $= \frac{5}{XXX}$, and V. prox. R. E., + sp. \ominus + 6. cyl. ax. $165^\circ =$ Jaeger X. Axis 30° gave the best vision both remote and proximal.

L. E., + 6. cyl. ax. $165^\circ =$ large objects only.

Various combinations of sphero- and crossed-cylinders were tried on the right eye without benefit. Whether the change in the axis from 105° to 120° in the right eye was due to further swinging outward of the vertical plane; or to astigmatism of the lens resulting from cataractous refractive changes, I do not know. (Crossed-cylinders did not improve vision).

Given a case similar to the above in which the axis in one or both corneæ is altered while under observation, will we set the cylinder at the axis first found, or at the axis caused by the muscular imbalance? I would answer, to make the test under full mydriasis by retinoscopy and ophthalmoscopy; then by test-types monocularly and binocularly. Then give the axis found by monocular examination with the test-types while fully atropinized. If this axis should differ from that found by binocular examination on the test-types and should cause the floor or book to tilt have the patient wear the glasses

anyway, because if there be muscular imbalance of the obliqui or recti, when the strain has been taken off the ciliary muscle the chances are that these muscles will regain their tone and hold the vertical plane in the proper line and thus coincide with the axis of the cylinder given. My belief is that if the axes were rotated in or out by muscular imbalance, and if cylinders were placed at the meridians that would be the proper ones if there were no muscular imbalance, that the distorted image falling on the retina would through reflex stimulation cause the obliqui or recti at fault to perform their proper function and thus rotate the eyes to correspond with the axes of the cylinders given, just as decentering a lens will cause a heterophoric eye to rotate in or out. Any heterophoria should be corrected by prisms or operation.

Of course, if we find that the wearing of glasses for some time, and the exercise by prisms, or an operation, does not cause the eyes to rotate into the normal vertical plane, and the floor or walls slant, or objects are distorted, then the cylinders should be changed so as to correct the binocular astigmatism and not the monocular astigmatism.

Another plan would be to give the axes as found by binocular examination and after these have been worn for some time give the axes found by monocular examination.

Several interesting articles have been written on "Binocular Astigmatism." The first that I can find is by my father, H. Culbertson, who held to the binocular correction theory (Transactions American Medical Association, 1888, also AMERICAN JOURNAL OF OPHTHALMOLOGY, 1888). I can not recall the name of the writer but think it was either Dr. Burnett or Dr. Savage, who, several years ago, wrote a very interesting article on the subject and was in favor of giving the correction as found by monocular test. (I have lost the journal containing the article).

Dr. H. Culbertson (Transactions American Medical Association, 1888) also contends that the phenomena of binocular astigmatism might be due to irregular action of individual sectors of the ciliary muscle or muscles.

Another very important point in test-type examinations to be remembered is that in high grades of astigmatism when the cylinder is placed at the proper axis or axes objects appear slanting or distorted. This is due to the fact that by custom and the association of ideas from infancy the image of

objects which are distorted on the retina appear to the mind's eye as being straight, but when the cylinders are adjusted the images are straight on the retina but appear crooked to the mind's eye as they have never been seen straight before. In these cases objects appear distorted for awhile but soon appear straight owing to the fact that new brain cells for the memory of the object are created which are connected with the old brain cells and by this association the objects appear straight, just as an infant is taught through the association of ideas that it can not grasp the moon.

I conclude I will say, that I tested the ophthalmometer with a spirit-level and plumb line and found it strictly accurate.

ADDITIONAL PAMPHLETS RECEIVED.

"The Proportion of Curable Cases in Strabismus," by Dr. L. de Wecker.

"Diseases and Injuries of the Sixth Nerve," by J. H. Thompson, M.D.

"Twenty-Ninth Annual Report of the Brooklyn Eye and Ear Hospital," 1898.

"Twenty-Ninth Annual Report Manhattan Eye and Ear Hospital," 1896 and 1897.

"The Question of Sign-Language and the Utility of Signs, Etc.," by A. Graham Bell.

"Keratactasia, Report of a Case, With Transparent Cornea," by F. C. Todd, M.D.

"The Asheville Plateau in the Mountains of Western Carolina," by S. W. Battle, M.D.

"The Non-Surgical Treatment of Boils, Carbuncles, and Felons," by L. D. Bulkley, M.D.

"Tuberculosis of the Iris and Ciliary Body With Staining of the Bacilli," N. J. Weill, M.D.

"A Contribution to the Study of the Dynamics of the Ocular Muscles," by J. M. Bannister, M.D.

"A Case of Bilateral and One of Monolateral Mastoid Disease; Recovery," by L. R. Culbertson, M.D.

"Amblyopia From Suppression, Congenital Imperfection or Disuse; Which, or All?" by Leartus Connor, M.D.

"A Study of the Ophthalmic Changes in Chlorosis, Pernicious Anæmia and Leucocythæmia," by Ch. A. Oliver, M.D.

SOCIETY PROCEEDINGS.

THIRD ANNUAL MEETING OF THE WESTERN OPHTHALMOLOGICAL, OTOLOGICAL, LARYN- GOLOGICAL AND RHINOLOGICAL ASSOCIATION.

MEETING HELD AT CHICAGO, ILL., APRIL 7 AND 8, 1897.

REPORTED BY ADOLF ALT, M.D., ST. LOUIS, MO.

The Western Ophthalmological, Otological, Laryngological and Rhinological Association held its third annual meeting on April 7 and 8, in Chicago, Ill. The beautiful and spacious rooms of the Chicago Medical Society were a most appropriate place for such a gathering. Altogether this meeting of the Association was not only the most successful as regards the members and the character of the men in attendance, of the papers presented and the discussions following them, but also on account of the large accession of new and desirable members.

The most hearty welcome accorded to the Association by our Chicago confrères, the most liberal and enjoyable entertainments offered by them, as well as the general spirit of mutual good will, made this meeting a most delightful one.

The Association was welcomed by Dr. F. Henrotin, the President of the Chicago Medical Society, instead of Dr. E. L. Holmes, who was unfortunately detained by illness. This was followed by a response by Dr. A. Alt. In a joint session the members then listened with great enjoyment to the most admirable and extensive address by Dr. H. Knapp, of New York, on "The Radical Tympano-Mastoid Operation." This was followed by an address by Dr. H. T. Patrick, of Chicago.

In the afternoon the real work of the sessions was begun, the Association dividing itself into an ophthalmological and an oto-laryngological section. It also changed its name to the

"Western Ophthalmological and Oto-Laryngological Association."

The officers elected for the ensuing year are: President, Dr. J. E. Colburn, of Chicago; First Vice-President, Dr. Wm. Scheppegrell, of New Orleans; Second Vice-President, Dr. Casey Wood, of Chicago; Third Vice-President, Dr. H. Gifford, of Omaha; Secretary, Dr. F. A. Rumbold, of St. Louis; Treasurer, Dr. W. L. Dayton, of Lincoln, Neb.

The place selected for the next meeting is New Orleans, Louisiana.

The following is a condensed report of the work of the Ophthalmological Section.

DR. ALT read a paper on "Recent Researches Into the Histo-Pathology of Trachoma" (see this issue), illustrated by photographs and later on followed by the demonstration of specimens.

DR. GIFFORD had at one time thought he had found a plasmodium in trachoma, but found he was mistaken.

DR. WILKINSON, of El Paso, Texas, stated that high altitude must be unfavorable to this disease, as he had only seen two cases in one and a half years.

DR. ALT stated that, it being illegitimate to infect man with this disease for experiment's sake, it is, of course, impossible to absolutely prove that the organisms, described by him, are really the trachoma parasites. He stated further, that some of his specimens were taken from dark negroes and offered as a probable explanation of the comparative immunity from trachoma, as proven by Burnett and others, the fact that the negro seems to be provided with accessory lachrymal glands in a much more liberal manner, than the white races.

DR. H. GIFFORD (Omaha) detailed five cases of Parinaud's conjunctivitis, monocular conjunctivitis characterized by granulomata, sometimes pedunculated, and ulcers and small abscesses between them, combined with fever and glandular swellings and even abscesses of the lymph-glands of the same side of the face. He thought Parinaud's idea, that the disease is due to animal infection is based on scant grounds. If left alone the disease heals in from four to six weeks. The granulations showed nothing particular under the microscope. Clipping off of the granulomata and cauterization of the ulcers

and abscesses gave the best results. No serious affection of the cornea has been observed.

DR. J. M. BALL (St. Louis) reported a case of quinine blindness from a dose of 60 grains of quinine.

DR. ALT asked after the final results, as he had seen bad final results years after such patients had apparently been cured.

DR. B. E. FRYER and DR. H. KNAPP stated that they had been able to follow up several cases, in which the cure had remained unchanged.

DR. H. GIFFORD saw one case fourteen years later and found a general improvement had gradually gone on in vision, the field, however, was concentrically limited.

DR. A. C. CORR, living in a malaria district, had given quinine in very large, sometimes enormous doses, and has never seen any toxic effect produced in the eyes. He thinks it is only a coincidence.

DR. B. E. FRYER (Kansas City) read a paper on "The Antiseptic Preparation of the Conjunctiva for Cutting Operations of the Eyeball" (see this issue). This paper was discussed by Drs. Wescott, Knapp, Dayton, Alt, Prince, Culbertson, Dickinson and Corr. One gentleman stated, that instead of using local antiseptics he prepares his patients with great satisfaction by the internal exhibition of mercury and iodide of potassium for several days previous to the operation.

DR. T. A. WOODRUFF (Chicago) read a paper in which he described De Zeng's refractometer and protested against the attempts, at present made, to foist this instrument on the profession and the opticians at an extravagant price.

DR. ALLPORT and some other gentlemen thought it quite a useful instrument.

DR. REYNOLDS (Louisville), in his paper, protested against all such instruments for measuring refraction and examines his cases always under homatropine, which he considers perfectly satisfactory in about 90 per cent. of the cases, and said that atropine, besides causing toxic effects, is not always able to relax the accommodation fully. The main point is to use the homatropine strong enough. He uses 24 grains to the ounce.

The discussion on this paper was very spirited and joined in by most of those present. The experiences related were of the most different kind. However, the general verdict seemed

to be that homatropine is much less reliable as a cycloplegic for refractive examination, than atropine or scopolamine.

DR. C. BARCK (St. Louis), reported a series of ten extractions of immature senile cataract (see next issue), with small iridectomy.

The paper was discussed by Drs. ALT and REYNOLDS.

DR. A. E. PRINCE (Springfield, Ill.), recommended the excision of the tarsal tissue for extreme non-cicatricial ectropium of the lower lid and related cases. (See next issue).

DR. F. ALLPORT (Chicago), offered a test-card to be used by school-teachers, with very practical simple rules for conducting such examinations.

DR. J. O. STILLSON (Indianapolis), read a paper in which he gave a résumé of all theories on and attempts at curing detachment of the retina and related his experience with multiple galvano-cautery punctures. (See next issue).

DR. L. R. CULBERTSON (Zanesville, O.), offered a paper on the rotation of the axis of astigmatism during ophthalmometric examination. (See this issue).

The report of a very interesting case of homonymous hemianopsia followed by total loss of vision in a case of uterine hæmorrhage due to fibroid tumor was read by DR. A. R. AMOS, of Des Moines. (See next issue).

Another most interesting case of angio-sarcoma of the orbit, with metastases in the skull, all abdominal organs and marrow of the long bones, with beautiful illustrations, was reported *in extenso* by DR. H. V. WÜRDEMANN, of Milwaukee.

Finally, DR. A. C. CORR (Carlinville, Ill.), related a number of cases of choroiditis and choroido-retinitis in young people, due to asthenopic strain.

The evening session was devoted to the presentation of specimens and cases by several Chicago gentlemen.

DR. C. H. BEARD (Chicago), showed a collection of paintings of ophthalmoscopic subjects which, by their excellence, excited the admiration of all.

DR. WUERDEMANN showed a collection of pathological specimens mounted in formaline jelly.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

HENRY EALES, M.R.C.S., Vice-President, in the Chair.

THURSDAY, JANUARY 27, 1898.

Epithelial Xerosis of the Conjunctiva.—MR. SYDNEY STEPHENSON made a communication upon this ailment, which he said was not uncommon in England, since among 6,209 children he had found no fewer than 1.87 per cent. affected. At particular places the examples of xerosis ranged from 0.66 per cent. to 9.47 per cent. After describing the appearances and bacteriology of the affection, the author passed on to consider its relationship to night blindness, which he regarded as something more than merely accidental. He pointed out that xerosis, in the absence of hemeralopia, was supposed to give rise to no symptoms beyond such as were presented by the conjunctiva. He had found, however, changes in the visual field—namely, (a) a reduction in size and a transposition of the red and green fields, and (b) a slight contraction in the limits of the field for white. The former was constant, the latter not always present. The retinal reflexes in these cases appeared also to be exaggerated. Mr. Stephenson concluded that every eye with epithelial xerosis was in a state of torpor retinae. In discussing the causes of xerosis he laid stress on two factors—first, lowered nutrition, and, secondly, dazzling by bright light. Most of his patients suffered from internal otorrhœa, hypertrophied tonsils, peripheral vascular opacities of the cornea, relapsing pustular eruptions of the face or scalp, or other signs of “scrofula” or tubercle. Hæmoglobin, according to Mr. Stephenson, was always reduced in amount, averaging in his cases of xerosis 65 per cent. of the normal, as tested by Gower’s hæmoglobinometer. As the conjunctival changes disappeared the proportion of hæmoglobin rose, but never to normal. This led him to inquire whether among children it was always below par. In conjunction with Mr. G. C. Burton he examined 164 healthy children, with the result that it was found to vary from 65 per cent. to 95 per cent., and to average 76.62 per cent. of the normal. Mr. Stephenson fur-

ther claimed that in xerosis the red blood cells were sometimes reduced in number. As to treatment, he strongly recommended iron, preferably in the form of Blaud's pills. Mr. Stephenson quoted a number of cases, and illustrated his paper by cultivations and microscopical preparations of the xerosis bacillus.

MR. ARNOLD LAWSON spoke of the resemblance which the bacillus of xerosis bore to the Klebs-Loeffler bacillus of diphtheria; the remarkable thing about it was its inertness, as it was so plentiful and swamped all the other bacilli.

MR. BREUER said that constitutional ailment and not the xerosis was the cause of the symptoms in this disease. In one case in which a post-mortem examination was made xerosis of the liver was found, bile acids dissolved the visual purple, and there might have been some relationship between the night blindness and the altered function of the liver.

MR. EYRE had attempted by raising the pathogenicity of the xerosis bacillus by varying the conditions of growth, and by injecting toxin to impair the resistance of the subject, to produce some effect by injecting it, but all his results had been negative, the bacillus remained inert.

DR. DRAKE-BROCKMAN had seen a great deal of this affection in the East and was glad to find his own observations in every respect confirmed. It was especially frequent in badly nourished children or those affected with tubercle or syphilis, or the subjects of intestinal parasites; it occurred among adults during famines. He found iron preceded by the removal of intestinal parasites the best treatment.

On the Function of the Rods of the Human Retina.—This paper was read by MR. A. BREUER, and dealt with the new theory of von Kries regarding the function of the human visual apparatus. He described experiments of his own, which tended to confirm the statement, that the function of the rods differed from that of the cones. By means of experiments after adaptation of the eye for dark he demonstrated that the sensibility of the periphery of the retina for feebly illuminated objects was very much greater than that of the macula. Under these conditions (dark adaptation) the macular part of the visual field was represented by an absolute scotoma, the exact extent of which was found to vary according to the intensity of the

illumination employed. The weaker the illumination and the longer the adaptation of the eye for the dark, the greater this area became. Other experiments made by von Kries illustrated the same fact. He found, for instance, that color equations found by direct fixation and in a strong light no longer held good with peripheral vision under feeble illumination. These changes, moreover, were most marked when employing lights of short wave length. All these points were modified examples of the well-known phenomenon of Purkinje, who showed first, that when blue and red objects of equal luminosity were selected, the blue gained considerably in brightness as the eye was longer adapted for the dark. This difference, however, as von Kries has shown, did not take place in small fields which fell entirely within the macula. Hence it was clear that the functions of the periphery of the retina and the macula were distinct. Other authorities attributed these differences to the presence of the yellow pigment in the macula. Mr. Breuer detailed an experiment, which proved that this assertion was not supportable. Further, Mr. Baeuer, in a paper published in *Zeitschrift für Physiologie und Psychologie der Sinnesorgane*, Band XIV, measured quantitatively the amount of absorption effected by the macular pigment for spectral lights of different wave lengths, and found it quite inadequate to account for the differences between peripheral and central vision. These and many other observations made it highly probable that the theory of von Kries was correct—namely, that a division of function seemed to exist between the apparatus connected with rods and cones respectively. According to him the latter, the cones, formed a trichromatic apparatus—that was, one capable of distinguishing the spectral colors, and requiring for its exercise higher intensities of light, resulting in greater definiteness and clearness of perception. The rods, on the other hand, constituted an apparatus adapted for exercise of function at far lower intensities of light with the natural drawback of being able only to distinguish between light and dark, and not between colors. Generally speaking it was the cones that were exercised in strong light and the rods in weak. Briefly summed up, this special kind of vision, or the function of the rods, was characterized by (1) its inability to distinguish colors; (2) a very pronounced sensibility for weakly illuminated objects; (3) a preference for rays of medium

and short wave length; (4) its total absence in the macula.

The Localization of Foreign Bodies in the Eye and Orbit by Means of Roentgen Rays.—MR. MACKENZIE DAVIDSON made a few introductory remarks as to the method of localization of foreign bodies by the Roentgen rays he had recently and fully described in the *British Medical Journal* of January 1, 1898. He then demonstrated the special application of the method for the detection, localization, and estimation of size of foreign bodies in the eyeball and orbit. The patient was seated upright, and his head fixed in a rectangular rest. The photographic plate was placed against the temple of the affected side behind cross wires. A lead wire was made to touch the edge of the lower eyelid opposite a known point on the eye, and the patient fixed his eye on a distant object during the exposures. These were made in the same way as for other parts of the body, and the interpretation of the skiagraphs was carried out by the use of the "cross-thread localizer."

MR. TREACHER COLLINS then gave a description of four cases in which this method had been applied. In none of them could the presence of a foreign body be certainly determined from the clinical appearances. In two of the cases the chip of steel was subsequently withdrawn by the introduction of an electro-magnet in the direction in which it had been ascertained to lie. The size of one of these bits of steel was practically the same as had been estimated previous to its removal. In another case, the eye being quiet, and two months and a half having elapsed since the injury, operative procedure was not thought justifiable. In the remaining case, which was the first they had dealt with before they had obtained sufficient experience of the method, the foreign body was found to lie in the orbit when they thought it was lodged in the eyeball. Mr. Collins also mentioned three cases where the presence of a foreign body in the eye was suspected in which they had by means of the *x*-rays been able to assure themselves none was there. In one of their patients, in whom a large number of exposures had been made, some loss of hair occurred a month afterwards from the temple which was directed nearest to the tube.

Card Specimens.—The following were the card specimens :

MR. G. HARTRIDGE—(1) Foreign Body Lodged in Eye-ball; (2) Rupture of Choroid with Extensive Retinal Pigmentation the Result of a Severe Concussion of the Globe.

MR. LAWFORD—Newly Developed Blood Vessels in the Optic Disc.

MR. ROLSTON—Case of Keratitis.

MR. POULET WELLS—Result of Scraping Calcareous Film of Cornea.

OPHTHALMIC DIGEST.

BY J. ELLIS JENNINGS, M.D.,

ST. LOUIS, MO.

THE TREATMENT OF COMPLICATED ULCERS OF THE CORNEA.—In a paper read before the fourteenth annual meeting of the Medical Society of the State of Pennsylvania, Dr. C. A. VEASEY, of Philadelphia, concludes as follows:

1. Examine thoroughly the conjunctiva, the lachrymal ducts, the nares and naso-pharynx, as well as the cornea itself, and if any abnormal condition be found that is either the primary cause of the ulcer or that is keeping up the condition, direct the treatment against it as well as against the ulcer itself.

2. Employ moist heat by means of the local application of pieces of lint or flannel wrung out in hot water at a temperature of 120° F. from fifteen to sixty minutes at a time, repeating at intervals varying from two to four hours, according to the virulence of the disease.

3. Cleanse the ulcer and the conjunctival cul-de-sac with some warm antiseptic solution immediately after the employment of the moist heat, and between the times of its employment if there be much discharge. For this purpose may be used a saturated solution of boracic acid, a solution of bichloride of mercury (1:6000), or a solution of formaldehyde (1:4000).

4. Instill a drop or two of a solution of atropine (four

grains to the fluid ounce) once or twice daily if the ulcer be central; but if it be peripheral, a solution of eserine (one-sixth of a grain to the fluid ounce) may be employed from three to six times during the day, and the atropine solution instilled once at night.

5. The eye must be protected by dark glasses or an evenly and lightly applied bandage. As a rule the former should be used in those cases in which there is considerable discharge, the latter in the cases in which very little discharge is present.

6. Should the above means fail to check the progress of the ulcer it should be curetted, and after dusting on its surface some iodoform, previously pulverized and sterilized, a bandage should be applied.

7. Should the ulcer continue to spread, after being curetted, it should be touched with some one of the chemical agents employed for the purpose. Of these the tincture of iodine, liquid carbolic acid, and silver nitrate (the latter in the strength of ten to twenty grains to the fluid ounce) seem to be the best.

8. The actual cautery should be applied after the previously described remedies have been employed without beneficial result, or even before these have been used if it be seen that the ulcer has assumed a malignant type—that is, if the cornea is becoming so rapidly involved that the destruction of all, or a large portion, of its tissue is threatened.

9. Any unhygienic condition, dietetic error, or constitutional diathesis should be corrected.

LESIONS OF THE RETINAL VESSELS, RETINA AND OPTIC NERVE, ASSOCIATED WITH GOUT.—From a clinical study of fifteen cases DR. CHARLES STEDMAN BULL, of New York (*The Medical News*, May 8, 1898), draws the following conclusions:

1. The changes in the fundus are always bilateral though rarely symmetrical in the two eyes. The lesions may begin simultaneously in the two eyes, but this is by no means always the case.

2. The degenerative changes in the walls of the blood vessels, both arteries and veins, are at first very minute, and are often overlooked. They must be carefully searched for, as they begin in the intima.

3. The general angiosclerosis, and the patchy exudation in the retina, cause marked impairment of central vision, but little impairment of the peripheral vision, and the disease never ends in blindness.

4. The loss of central vision is always progressive up to a certain point. Improvement of the vision, after the retinal disease is established, can not be expected, though in favorable cases the existing vision may be maintained.

5. Hæmorrhages into the retina are rare except in the comparatively early stages of the disease. When the vessels lose their elasticity by reason of the increase in the thickness of their walls, due to the deposits, the vessels become stronger and more rigid, and hæmorrhages are no longer to be feared.

6. The most marked feature in the ophthalmoscopic picture is the development of the angiosclerosis in the vessels of the retina. This condition is confirmed by the microscope, and is seen to extend to the vessels of the optic nerve and choroid.

7. Another almost equally marked symptom is the peculiar yellowish granular exudation in the retina, located by the ophthalmoscope around the posterior pole of the eye, and generally leaving the macula intact until late in the course of the disease. This exudation is shown by the microscope to be mainly in the nerve-fiber layer, though found in all the layers except that of the rods and cones.

8. The changes in the optic nerve-fibers seem to be generally intra-ocular, but have been traced occasionally for some distance back of the eyeball.

THE DESIRABILITY OF A PERISCOPIC QUALITY IN CORRECTING LENSES.—In a paper read before the American Ophthalmological Society, May 27, 1897, DR. C. M. CULVER, Albany, N. Y., says that such a quality can and ought to be often obtained. Simple spheric lenses are nowadays mostly menisci, and are mounted with the concave surface toward the eye. In cases of compound astigmatism, however, the prescriber is apt to combine the spheric lens that corrects the ametropia of the least ametropic meridian with the cylindrical lens that corrects the astigmatism, of itself, making the latter concave when the eye is myopic in all meridians,

and convex when the eye is hyperopic in all meridians. In the case of an eye that is hyperopic by 1.00 D. in its vertical meridian, and by 2.00 D. in its horizontal meridian, the usual prescription would be:

Sph. + 1.00 \ominus cyl. + 1.00, axis vertical.

A better form of lens, having the same optical power, but being at the same time periscopic, has the formula:

Sph. + 2.00 \ominus cyl. — 1.00, axis horizontal.

In case the eye is myopic by 1.00 D. in its horizontal meridian, and by 2.00 D. in its vertical meridian, the usual formula is:

Sph. — 1.00 \ominus cyl. — 1.00, axis horizontal.

A better one reads:

Sph. — 2.00 \ominus cyl. + 1.00, axis vertical.

The foregoing are but type cases, and the application of the principle involved may be made to manifold combinations of hyperopia, myopia and emmetropia. In cases of simple astigmatism it is better to prescribe a compound, periscopic lens than one having only a plano-cylindric combination. Instead of:

Cyl. + 1.00, axis vertical,

it is better to write:

Sph. + 1.00 \ominus cyl. 1.00, axis horizontal.

Instead of:

Cyl. — 1.00, axis horizontal,

it is better to write:

Sph. — 1.00 \ominus cyl. + 1.00, axis vertical.

While the formula for a correcting lens, prescribed according to what is here recommended, does not show at first glance the character of the ametropia present, it requires but a moment's thought to determine whether the concave or convex element is preponderant.

THE PREPARATION OF MACROSCOPIC PHOTOGRAPHIC ILLUSTRATIONS. — In an article entitled "Illustrative Cases Showing the Indications for Enucleation of the Eyeball With Macroscopic and Microscopic Photographic Illustrations From Specimens," DR. H. V. WUERDEMANN, of Milwaukee (*Annals of Ophthalmology*, Vol. VI, October, 1897, No. 4), explains the method of preparing macroscopic illustrations as follows:

Wash blood from the enucleated eye and place in a 5 per cent. solution of formalin for a few days; wrap in gutta percha tissue- or wax-paper; freeze in mixture of rock salt and chipped ice; cut with razor or scalpel. Place for twenty-four hours in a 33 per cent. solution of glycerine and water; then in 50 per cent. glycerine and water for twenty-four hours more. Mount in special jar, cell downward, in glycerine jelly (and remove bubbles by pipette) which is made in the following manner: Soak 1 oz. "Gold Label" gelatine in 8 ozs. water for twenty-four hours; add shells and whites of two eggs and boil over water bath for twenty minutes, stirring constantly; filter and add equal amount of glycerine; add a few drops of carbolic acid to preserve until wanted for use. Expose to fumes of formalin under bell-jar for twenty-four hours to harden the jelly permanently. Seal cup by cementing on the glass cover.

Wishing to exactly reproduce the eye sections, I endeavored to have photographs made, but found that no ordinary exposure would sufficiently elaborate the detail. When it is borne in mind that the bottom of an half eye is nearly half an inch from its cut edge or periphery, it is seen that these lie in different planes, and no ordinary lens or exposure will give a sufficient depth of focus for proper expression of the detail in the negative or print. Such may only be obtained by exceedingly long exposures, the use of the smallest diaphragms, and a rectilinear lens.

Accordingly, after many trials, the specimen in the jars were exposed to bright sunlight from six to eight hours, a copying camera being used with the smallest diaphragms, a deep orange cell made expressly for the purpose being placed before the objective in order to filter out the heat and non-actinic rays. An orthochromatic plate was used in the holder, and the specimens enlarged one-third. The backgrounds were stopped out in the negative, and the photograph (a platinum print) reproduced (reduced one-third) by the photo-tint process with the excellent result seen in the accompanying figures. Such faithful adherence to the natural appearance of the specimen could not be secured by the brush of the artist.

BOOKS AND PAMPHLETS.

RETINOSCOPY (OR SHADOW TEST) IN THE DETERMINATION OF REFRACTION AT ONE METER DISTANCE, WITH THE PLANE MIRROR. By JAMES THORINGTON, M.D., Adjunct Professor of Diseases of the Eye in the Philadelphia Polyclinic and College for Graduates in Medicine, etc. Second Edition, Revised and Enlarged. Thirty-Eight Illustrations, Twelve of which are Colored. Philadelphia: P. Blakiston, Son & Co., 1012 Walnut Street. 1898.

The appearance of a second edition of Dr. Thorington's work on Retinoscopy within a year is a well-earned tribute to the value of the book. To make this edition more lucid than the first, the writer has carefully reviewed the original text and has added many new illustrations, twelve of which are in colors. A description and drawings of three lenses, suggested by the author for the study of the scissor movement, conic cornea, and spheric aberration on the schematic eye, have been inserted. This work is indispensable to those who desire a simple practical description of the shadow test. J. E. J.

THE EYE-OPERATIONS (DIE AUGENÄRZTLICHEN OPERATIONEN). By DR. W. CZERMAK. No. XI and XII. Wien, Carl Gerold's Soehne, 1898. Price, 9 marks.

These numbers of the series previously mentioned and most heartily recommended to our readers, treat on the operations on the iris. We can only reiterate our former praise.

ALT.

PAMPHLETS RECEIVED.

- "Hemianopsia," by W. Harris, M.D.
- "Authors and the Journals," by S. S. Bishop, M.D.
- "Clinical Tests of New Remedies," by S. S. Bishop, M.D.
- "Note on Diastatic Preparations," by W. G. Tucker, M.D.
- "The Antitoxin Treatment of Tuberculosis," by Ch. Denison, M.D.
- "Solution of the Proprietary Medicine Problem," by C. C. Fite, M.D.
- "Asheville Sanatorium," by S. W. Battle, M.D. and J. W. Ross, M.D.

THE AMERICAN JOURNAL OF
OPHTHALMOLOGY.

VOL. XV.

MAY, 1898.

NO. 5.

ORIGINAL ARTICLES.

DETACHMENT OF THE RETINA.—REPORT OF
FIVE CASES OPERATED ON BY THE MUL-
TIPLE PUNCTURE OF THE SCLEROTIC
WITH THE GALVANO-CAUTERY.
FOUR RECOVERIES; ONE
NEGATIVE RESULT.*

BY J. O. STILLSON, A.M., M.D., INDIANAPOLIS, IND.,

OPHTHALMIC SURGEON TO INDIANAPOLIS CITY HOSPITAL, AND CITY DISPENSARY—
CONSULTING OCUList AND AURIST TO PROTESTANT DEACONESS' HOSPITAL—
OPHTHALMIC SURGEON TO ELEANOR HOSPITAL FOR CHILDREN—LATE
PHYSICIAN TO THE INDIANA INSTITUTION FOR THE BLIND.

SCHNELLER, of Danzig, in 1881¹ called attention to cer-
tain facts which shed light on the nutrition of the retina,
or rather on certain elements of nutrition which arrive at dif-
ferent layers of this structure, such as the epithelium, the pig-
mentary² elements, etc., and shows that the retina itself may
be the seat of morbid processes prior to the occurrence of
pathological changes in the choroid which so frequently attract
attention in connection with the disease.

*Read before the Third Annual Meeting of the Western Ophthal-
mological and Oto-Laryngological Association, held at Chicago, Ill.,
April 7-8, 1898.

Why the retina should let go from its cement attachment and particularly in the neighborhood of the rods and cones would give rise to speculation as to the idea of a decrease in the support afforded by the vitreous when of normal consistency unless it should be shown that certain relative differences exist between different persons as to the consistency of the vitreous, some being of a lighter specific gravity than others as, for example, in myopes, a point which the writer does not presume to say, it being of course understood that physiological eyes alone are considered. Were this found to be the case it would place in a certain group eyes more likely to become the prey of detachment than others even as healthy eyes beyond the fact that they would so suffer under pathological or traumatic conditions.

Czerny³ found that the effect caused by continuous concentration of the solar rays upon the retina of frogs, birds, and some mammals was to bring about a disintegration of the external layer next to the choroid; and a separation of the rods and cones from the pigmentary surface of the choroid took place. The pigment remained with the choroid and streams of leucocytes appeared among the débris of the broken retinal elements respectively, the rods and cones.

Retinitis, commonly called chorio-retinitis, is always accompanied by pigmentary alterations, which are swept as it were by the tide of exudation into the structures of the retina. This pigmentary epithelium receives its nourishment from the choroid while the rods and cones get their supply from the capillaries of the retina out of the retinal arteries. Kuehne⁴ speaks of the so-called retinal purple being secreted by the choroid as the pigment is regenerated, and that the inflammations of the external layers of the retina are to be met with only as initial lesions in exudative choroiditis, while inflammations of the inner layers of the retina may take place without any lesion whatever of the choroid, and frequently do. It is, moreover, a fact hardly within dispute, that we frequently have retinitis of the inner layers, without detachment and without choroidal implication, and as Czerny³ says, "detachment is preceded by alterations in the epithelium, and in the rods and cones it follows that the adherence between these two layers diminishes; nevertheless, when reunion occurs and the restitution of the function of the retina takes place, as it sometimes

does, even after a year of detachment, the retinal vessels seem to be able to supply a certain (diminished to be sure) amount of nourishment to the rods and cones." The nourishment thus transmitted from the blood vessels, evidently must consist of transparent leucocytes, which, having escaped from the capillaries by diapedesis, find their way through the external granular layer of Stricker,⁵ including the external fibrous layer, the external molecular (granular or inter-nuclear layer), Landois and Sterling,⁶ the so-called external plexiform (reticular) layer, Norris and Oliver,⁷ and arrive at the base of the bodies of the visual cells in the highest and most perfect condition of normal physiological perfection. When, however, after rupture and separation has occurred, the re uniting of the separated elements is attended by the phenomena of repair common to other tissues, viz., the interposition of connective tissue elements which in time cement together to form a more dense structure, this inhibits to some extent the perfect interchange of nutrition from the source of supply to the distal field of demand. It would be preposterous to claim that the retina receives no nourishment at all from the choroid. As well claim that the heart receives no nourishment from the lungs, or *vice versa*; yet the heart has its own system of blood vessels which beyond question nourish its structure and the lungs the same; both organs are mutually interdependent; so also the choroid and the retina; yet evidently the retinal vessels are there for a purpose, and if not to nourish the light-perceiving apparatus, then why do we have photopsias in choked disc, or blindness in atrophy, so long as there be no interference to choroidal circulation?

Schweigger⁸ (1883) maintains that not only must the etiological factor of nourishment to the retina be taken into consideration, but also that of the nourishment of the vitreous, as demonstrated by H. Müller as well as himself. Solutions of continuity can oftentimes be seen in recent cases, these lesions occupying peripheral locations where the retina recovers more easily. In cases, however, complicated with rupture, therapeutic measures are wholly useless, and even the intervention of surgical means, on account of the communication between the vitreous and sub retinal effusion. In cases without rupture puncture followed by diaphoresis with salicylates and pilocarpine may bring about a good result, especially if the detach-

ment be a recent one. This author reports several cases of spontaneous cure, and in one case the detachment was restored after eight months with V. = $\frac{20}{LXX}$ and Sn. No. 2 at 7 inches. In another case the retina resumed its position within a year. The author, however, reports disappointment with puncture, the results having been found later to have been but transitory. Leber⁹ (1882) discusses two theories explanatory of detachment visible with the ophthalmoscope, one that the secretion of liquid by the choroid forces the retina inwards away from the pigmentary layer of the choroid, and the other that of retraction or attraction exerted within the vitreous in front of the retina pulls the retina inwards, as Müller expresses it. This theory of Müller is, according to Leber, applicable to the eyes that are phthisical, that is, where the tension is minus, but he does not think it applies to eyes with a scleral puncture from foreign bodies which become afterwards encysted. In the diagnosis of detachment we are constantly forced to give consideration to the idea of abnormal secretion. Cases frequently occur where the ophthalmoscope reveals no trace whatever of connective tissue development in the vitreous, but where we readily, in the fact usually, observe floating bodies in the vitreous, with liquefaction. The tension may remain unaffected, normal, and still the retina slips away from its attachment, crowds itself forward into the vitreous, and in order to give it place, a certain volume of vitreous seems to become absorbed while the fluid behind goes on forming, or if there be a rent in the retina the simple change of place which takes place in the location of the fluid allows a portion to occupy the sub-retinal space instead of the vitreous. Samelsohn (*loc. cit.*) finds it difficult to understand how the theories of Leber and Müller can explain all the facts under consideration. If the perforation is primitive and tension remains normal in most instances, it is easy to suppose that the retina being perforated, the vitreous would not cause the retina to let go. This last observer remarks that if the tension be carefully taken there will oftentimes be found a diminution more or less transient and irregular. This he observes in connection with a deep anterior chamber in certain instances. Stilling¹⁰ (Strassburg, 1884) reported a case of enucleation where it was found that the vitreous had condensed and shrunken to considerable less size than normal while a certain degree of homogeneity

was maintained. He claimed in this case the detachment could not be explained on the grounds of being forced away from the sclerotic, nor by the idea of perforation, but that it was drawn by attraction of the shrinking vitreous in its retreat toward the center of the bulb.

The committee appointed by the Ophthalmic Congress of Paris, reported by Poncet¹¹ in 1897 that (*a*) the proportion of double detachment to simple detachment is as 1 to 9; (*b*) detachment may occur at the most tender age; the proportion increasing between the ages of 10 to 20; from 30 to 40 proportion remains equal; (*c*) increasing again from 40 to 70, maximum at 60; (*d*) men are affected in proportion of about 62 per cent., women 38 per cent.; (*e*) among professions the most frequent are writers, scholars and students; (*f*) myopia furnishes 37 per cent. of cases, choroiditis 16 per cent., traumatism 19 per cent., various 28 per cent.; (*g*) the consequences are frequently atrophy of the globe. Operative results among members of the Society up to that time are not very satisfactory. Coppez¹² reports 18 iridectomies according to the modified operation of Wolf, with 1 complete cure and 5 disastrous results, the rest partial success only. M. Horstman,¹³ before the Ophthalmic Congress at Heidelberg (1891), reports having met with 61 cases of detachment during a period of six years, 33 were men and 28 were women, 19 were kept under observation three years, among which 3 recovered entirely, the first was a man of 19 years, the second 48 years, and the third—a myope of 6.00 D., 38 years. All these cases were non-perforating. In one case he observed the pigmentary layer follow the retina two years after the commencement. In other cases marked changes were present in the choroid. He claims that there are two classes of detachment, one due to choroiditis and the other to retraction of vitreous. The tension remains normal in the exudative variety, in the other it was minus. Treatment, rest and diaphoresis.

Hirschberg¹⁴ (1891) reports three cases of spontaneous recovery among myopes. Treatment simple, rest and medication, diaphoresis, etc.

Boucheron¹⁵ (Paris, 1891) claims a certain curative procedure which he had practiced with success, which he calls dialysis undertaking to cause the sub-retinal fluid to become absorbed and eliminated through the anterior chamber and filtra-

tion spaces and ciliary circulation. He operates on the anterior chamber: *keratomy*, *sclero-keratomy*, and *iridectomy*. These have one objective point in view, elimination anteriorly. General treatment is added. Paracentesis may be repeated.

Stedman Bull¹⁶ reports (Amer. Ophth. Soc., 1894) a series of 38 cases of traumatic detachment and spontaneous recovery. His treatment consisted in confinement in bed, pressure-bandage, pilocarpine, bicarb. sodæ, iodide potass., internally. Occasionally he punctures the sclerotic with a von Graefe knife as near to the seat of detachment as possible; the conjunctival opening being left in the form of a valve. He advises never to resort to puncture where there is any inflammation present in the globe.¹⁷

M. G. Martin¹⁸ (Bordeaux) employs for puncturing the sclerotic in certain cases of anterior staphyloma and in detachment of the retina, the galvano cautery, producing a certain open fistula which permits the sub-retinal effusion to escape in addition to an irritation which causes an adherence between the retina and sclerotic. He modifies this operation in some cases by using the actual cautery (a small iron instrument heated sufficiently to accomplish igneous puncture). This he prefers to the platinum, which bends easily.

Abadie¹⁹ (18,1) pronounces ablation of the retina a local disease, due to local causes, and claims a surgical procedure to be the most rational. He recognizes that sudden detachments come on in myopic eyes when the patients are in the best of health and no indication whatever of a diathesis is present. The same author²⁰ eight years later (1889), reporting *in extenso*, changes his views somewhat; he refers to simple puncture, drainage, puncture by means of the galvano-cautery and electrolysis, all of which he had tried with only transient, never permanent results. Likewise, with all purely medicinal means, prolonged repose, mercurials, pilocarpine, diaphoresis, etc., the general rule in his hands was to procure only moderate benefit which failed to compensate the patient for his fatigue and confinement. Still he, like confrères of that time, felt indisposed to abandon his effort, convinced that the vast majority of detachments occurs in eyes myopic where gradual distension of the globe provokes a solution of continuity between the retina and choroid. In order to procure (1) an adherence of the retina at the place of detachment, and (2) to arrest as far as pos-

sible the distension of the globe, he proposed to accomplish the double result, first by practicing a free opening by sclerotomy, and second by producing irritation at the point of opening by injecting five or six drops of a solution of: Tr. iodine 5 grammes; Aquæ destill., 5 grammes; Iod. potass, 0.25 centigrammes, by means of the syringe of Pravaz. The evacuation of the fluid is then followed by a slight inflammatory process which he claimed agglutinates the retina to the choroid. A year later, at the Ophthalmological Society of Paris,²¹ he confirms his former opinion, and refers to an instrument composed of a canular knife with which he makes both the puncture and the injection. In 1893²² he advocates electrolysis. Galezowski,²³ Meyer, Chavallerau and Valude all contest with Abadie his claims, and refer to the same procedure having been reported by Schoeler, and that neither a sufficient number of cases nor any adequate amount of time has been forthcoming to demonstrate whether this procedure would prove permanent in its results or not.

DeWecker²⁴ (1882) speaks of numerous experiments in his clinic with the galvano-cautery in the manner formerly advocated by Abadie, and expresses surprise that the reaction from this instrument should be so slight. This kind of a puncture, he reports, left an opening sometimes which remained six to twelve days, afterwards the ophthalmoscope reveals the cicatrix resembling a choroidal rupture.

Wolf²⁵ (Glasgow, 1885) performs puncture with a broad needle with a groove on one side which facilitates the escape of the fluid. He also uses a spatula to open the wound if any fluid remains. He has reported cases of cure with vision equal to counting fingers at one and one-half meter distance.

Mittendorf²⁶ (1885) claims that certain detachments, particularly those attended by a decrease in tension, resist all treatment. He finds his best results to come from pressure-bandage and complete freedom from accommodation, pilocarpine injections, jaborandi, mydriasis.

Dansart²⁷ (1885) reported 23 cases of detachment in which he employed the procedure of Wolf with the addition of iridectomy either before or after the puncture. In some of his cases he obtained fairly good results as to vision, in others only slight improvement.

Warlomont²⁸ (1886) discusses critically the procedure of

Dansart and writes interestingly on the subject of iridectomy alone or as a modification of Wolf's operation for detachment. He favors it on the grounds that a general beneficial result can be expected from iridectomy in all cases of hypersecretion in the globe; he believes that von Graefe himself might possibly in time have to come to the use of iridectomy for detachment as well as for the glaucomatous process. His method as to technique, is (1) iridectomy, (2) horizontal rest in bed, (3) pressure-bandage, (4) the use of pilocarpine; four or five injections are to be given to each patient, but he does not specify how often nor how much.

Brailey²⁹ (1885) reports the case of a man who, while passing along through a tunnel, suddenly became blind, probably from hæmorrhage. Fourteen years afterward he was seen by Brailey who found double detachment. An iridectomy was made upwards with some benefit to vision. Afterwards a scleral puncture was made which resulted, according to the report, in almost complete restoration of sight.

Coppez³⁰ (1887) reports 18 iridectomies in selected cases, all recent; he obtained one complete cure, five operations were disastrous. With the operation of Wolf, modified by iridectomy, in 17 cases he obtained two complete cures and an amelioration in nearly all other cases; in only two cases could he conclude that the operation aggravated the existing conditions.

Sutphen³¹ (Newark, 1889) reported a case of operation by puncture on both eyes of one patient with a complete favorable result on one eye and on the other *nil*. The patient was obedient in every way and remained in bed many weeks.

Schoeler³² (Berlin, 1889) reported the use of tr. iodine two to six drops injected into the sub-retinal space after puncture and escape of the fluid. There was moderate pain, some decided though not high reaction, followed by conjunctivitis, (bulbar), which disappeared in a few weeks. Positive good results were claimed but no statistics given. This author reports again (1886)³³ confirmation of his former views, and especially in cases where some vision still remains in the eyes, *i. e.*, partial detachment.

M. F. Eve³⁴ (1895) reports to the Ophthalmic Congress, Paris, a case which had been treated by ordinary methods—pilocarpine, iod. potas., prolonged rest, pressure-bandage, etc.,

without effect. He then introduced, after incising the sclerotic, a canula, evacuating the fluid, after which he passed through the canula a horse-hair which he left in the wound for drainage. Three days later he was compelled to remove the hair on account of the excessive reaction. Some days after that the field of vision become normal with V.= $\frac{6}{xx}$. Opacities in the vitreous were present and persistent; these interfered with further improvement.

M. Terson³⁵ (1895) reports the employment of electrolysis with a current of five milliampères; he regards it superior to puncture.

Casey A. Wood³⁶ (Chicago, 1886) reviews the different methods of operative procedure, including the recent experiments of Deutschmann (incision of the vitreous and introduction of sterilized vitreous of rabbits), and comes to the conclusion that none of these methods possess decided advantage over the old-time procedures—rest, bandage, diaphoresis, etc. Numerous reports of spontaneous cure lead to the supposition that in many cases of reported cure following operations we do not know but that if those cases had been subjected to treatment without operation results equally favorable might have been obtained.

Montgomery³⁷ (1897, Intern. Med. Cong.) claims that the theory of Leber can not be accepted because ordinary detachment is caused by choroidal exudation. The hypothesis of Rhaelmann is not free from objections. The experiments of Schoeler and Deutschmann are also founded on purely speculative grounds, besides they are not free from danger—a point we should never forget in our therapeutics.

In view of the numerous authorities which have been cited, and the general pessimism which seems to prevail as to the advisability of operative interference at all in cases of detachment, it would seem almost presumption for the writer of this article to set up an opinion on the subject, or to undertake to add anything to what has already been said. However, while a few swallows do not make a summer, the writer is of the opinion that every case treated or operated should be reported, and each experience, however humble and unpretentious, should be reported for the general good of the profession and for the sake of truth. With this explanation, therefore, the writer begs leave to report the five following cases in which

good results were obtained in four, with one negative. After having tried puncture for some years, and all the medical measures which have been recommended from time to time, one thing has been constantly forced upon the attention of the writer, viz., that a puncture, however carefully made, is liable to close before quite all of the fluid has been evacuated, and certainly often fails to provide for the escape of the exudate formed after the puncture. A detachment, therefore, partially relieved, is liable to relapse from the re-formation of fluid exudate.

Chemical irritants, iodine, etc., produce exudation, and they may favor union if the opening be large, but if the latter be small or if it should close again the sac will re-fill. Moreover, an opening, if too large, favors rapid decrease in tension. Electrolysis is fraught with too much pain which even cocaine will not overcome. Therefore, a gradual evacuation, kept up for a long time without irritation, seems to offer the best means of allowing the retina to resume its place. This is better accomplished by means of more than one puncture, made in such a way as not to be too large, and at the same time remain open. The writer has not met in his reading the suggestion of multiple puncture of the sclerotic—that is to say, a puncture at the seat of the lesion, and then by withdrawing the instrument making another, a counter-puncture, in some other part of the globe, usually on the other side or at least one-third of the diameter of the globe removed from the first puncture, provided the detachment be large; not so far away if it be small. The diagnosis is to be made out as to the location and size by examination in the upright image. The head is to be tilted to one side and then the other until the most dependent portion is determined; this is the location of the first puncture. The second is made in or near the edge of the detachment if it be large or even well in it, usually not in the sound retina when the detachment is small, and yet far enough away to get the beneficial mechanical effect of a vent, so to speak. The further object of the two punctures is to avoid making the one so large and to facilitate gradual and prolonged filtration of the fluid out of the sub-retinal space. The openings are made with the galvano-cautery plunged in directly at right angles to the sclerotic, and not in such a way as to form a valve. The point which is white or red should be held a moment in place with-

out turning off the current and gradually withdrawn. This burns a round hole which will not close as rapidly as one made with a knife or otherwise; the writer has seen it remain open six or eight weeks, in one case ten. The new exudate will escape as fast as it is formed; usually the retina attaches itself at the periphery first, and lastly at the point of puncture. The reaction is never violent, in fact, there is no milder, kinder, or less irritable procedure possible, so far as the experience of the writer has gone.

Simple as this seems to be, it has served a good purpose. The lack of many cases is to be regretted. The one unfavorable report below was probably an unsuitable case for any operation or treatment.

CASE 1.—Three years ago a farmer, aged 40 years, tall and slender, but of good physique and healthy, fell out of a hay-loft alighting between two joists of the floor below, which gave way; he was caught by both arms in the axilla; he was severely injured, jarred and stunned; he was removed to the house where he lay several weeks. Two months after this he discovered that one eye was blind. I found almost complete detachment. Puncture with cautery through sclerotic back near the equator at external canthus below external rectus; second puncture at inner canthus below caruncle; liberal exudate escaped; rest, pressure-bandage, pilocarpine, iod. potass. Treatment, four weeks; recovery. V.=²⁰/_{LXXX}, and this was improved eight months later; no relapse, now three years.

CASE 2.—Preacher. Has been nearly blind in left eye for ten months. Large detachment, not however complete. Conservative (medical) treatment in bed for four weeks; little improvement; more than the lower half of the retina remained detached; two punctures in lower half of the globe; retina returned to place in five weeks; has remained two years. V.=²⁰/_C.

CASE 3.—Lady, aged 46 years; good health; M.=2.00 D. Six months ago sight in left eye failed suddenly. Lately has not been able to see to count fingers at 1 meter. Outer lower quadrant of retina detached, floating bodies in vitreous. Two punctures in sclerotic with cautery, one above external rectus well back towards equator, the other below and somewhat external to the median line about at the border of the inferior rectus; rest in bed for six weeks. Second puncture at the end of the third week; retina all went back. Last puncture con-

tinued to allow escape of drops of exudate at the end of the tenth week, then closed. $V.=^{20}/_{XC}$; has remained so, now one year. The vitreous at present is clearer than before; complete red reflex from fundus looks fairly well.

CASE 4.—Barber. Had slight retinal hæmorrhage two years ago. Was treated; improved; choroidal patch near macula lutea. While playing with his little child on his lap, the latter struck him on the eye with the back of her hand; sudden blindness; detachment, and hæmorrhage. Two punctures were made at temporal and inferior part of sclerotic; copious sanguino-serous exudate escaped; vitreous still too dark to admit light; can not see fundus except at inner upward side. $V. =$ count fingers at 3 feet outward and downward. Result negative.

CASE 5.—Nun, aged 36 years; sudden blindness after exhaustive vigils. Detachment, lower half of retina, involves macular region. Two punctures; copious escape of clear fluid. Leeches, bandage, pilocarpine, rest in bed; lower puncture still open, fifth week; retina returned to place. Watched case for five weeks more. $V.=^{20}/_{LXX}$. Seen again after one year; retina still in place; other eye myopic 3.00 D.

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EXTRACTION OF IMMATURE SENILE CATARACT.¹

BY CARL BARCK, M.D., ST. LOUIS, MO.

THE unpleasant situation of the patient as well as the physician whilst waiting for the so-called maturity of senile cataract is well known. In many instances we would act cruelly by wasting years, most valuable at this age, looking forward to a stage which is frequently never attained. These considerations have evoked the numerous methods of artificial ripening, none of which, however, has been generally adopted by the profession.

The definition of maturity is differently given, without being satisfactory. Its conception arose more than fifteen hundred years ago from an old mistake of humoral pathology—namely, that cataract is an exudation within the pupillary area which is at first semi-liquid and soft, and afterwards becomes solid by coagulation. Celsus, the first to speak more explicitly

¹Read before the Third Annual Meeting of the Western Ophthalmological and Oto-Laryngological Association, held at Chicago, Ill., April 7-8, 1898.

on cataract, says: "There is a kind of ripening of a cataract. It is therefore necessary to wait with the operation until the cataract is no longer liquid, but has reached a certain consistency by coagulation."

In spite of the true recognition of cataract as an opacity of the crystalline lens in the beginning of the last century, the old teachings and terms were not discarded. Richter, in the first half of this century, confesses for instance, that he did not know exactly upon which quality the terms mature and immature were based. Afterwards Arlt's definition was most generally accepted: "That in a matured cataract the lens lies in its capsule like a ripened fruit, and can be enucleated with ease."

The time has arrived for casting aside inherited theories and fancies and a modification of our views. When dissecting fresh eyes of animals I was struck long ago by the easiness with which the entirely transparent lens develops *in toto* out of its capsule, provided the incision is a large one. The practical question is not one of opaqueness but of coherency, and the old idea that the latter is directly dependent on the former, is incorrect. The lens, with advancing years, becomes more and more coherent, and will allow, after the age of 55 or 60, an easy and complete removal through sections sufficiently large. Some observations have even convinced me that in immature cataract the different portions of the lens are sometimes more coherent than the cortical layers of a mature soft cataract.

My experience coincides with that of my predecessors. The first one to part with the old teachings and actions based thereupon was Hirschberg, of Berlin. He reported in June, 1892 (*Berlin. Klin. Wochenschr.*), 35 cases of extraction of immature cataract, in all of which the development of the lens in its entirety was just as easy as in mature ones. The final results were even somewhat better than those of the 165 remaining cases out of a series of 200. The step taken by Hirschberg was bitterly opposed on theoretical grounds and he found only a few disciples in Germany, one in Italy (Vitali) and, to my knowledge, only one in this country, Dr. de Schweinitz (*Ophthalmic Record*, June, 1896).

I commenced to follow Hirschberg about three years ago, and I want to confess that with some hesitation and anxiety I extracted the first immature cataract. I have now operated 10

cases, which is seemingly a small number, but my experience happily corroborated in every instance the teachings of Hirschberg. I was astonished at the ease with which a lens quite transparent can be developed in its entirety. All that is necessary is a large corneal and especially capsular incision, sufficient to insure an unhindered exit. The latter I make vertically from below upward, going as far as possible behind the iris, and then add two horizontal ones, from the nasal and temporal sides respectively, meeting the first.

It is scarcely necessary to report the cases in full, and I confine myself to the salient points. In a number of them there was only a small central opacity and the peripheral portions transparent enough to allow a plain view of the fundus, after dilation of the pupil. In three, we tested the lens immediately after the operation by laying it upon printed type and found that it was plainly readable through the cortical portions. The vision before the operations was as follows: $\frac{6}{L}$, $\frac{6}{L}$, $\frac{6}{L}$, $\frac{6}{LX}$, $\frac{6}{LX}$, $\frac{3}{L}$, $\frac{3}{LX}$, $\frac{2}{L}$, $\frac{1}{LX}$, $\frac{1}{LX}$.

A small iridectomy was made in each case. In only one instance a small part of the lower posterior cortex was found wanting on examination of the lens, most probably stripped off by too small a corneal incision. It afterwards swelled, but became resorbed without reaction. In one of the cases a secondary discission was performed, and in the last case operated, which is still under treatment, it may also be required. The final results were: $\frac{6}{XII}$, $\frac{6}{XV}$, $\frac{6}{XV}$, $\frac{6}{XV}$, $\frac{6}{XXIV}$, $\frac{6}{XXXVI}$, $\frac{6}{L}$. One patient left for the country, and the glasses were afterwards prescribed by his physician there. Reports good vision. Two were not tested finally.

Two cases in this series, although not senile cataracts, might be worth while reporting more fully. They were a rare instance of congenital central cataract in a young lady of 19. There was a snow-white nucleus in a perfectly transparent cortex. The reported increase of impairment of sight within the last three years indicated a progressive character. Vision in each eye, $\frac{6}{LX}$. I wavered for some time between discission and extraction, but expecting a slow and perhaps incomplete resorption, and being pressed for time, determined on the latter. The sticky transparent lens-mass with a sharp, defined nucleus in its center, was delivered easily and completely. Healing regular. Two weeks afterwards I operated the left

eye in the same manner. In this a discussion followed. Final results in both eyes, $\frac{6}{xv}$, reads diamond type.

The conclusions I would like to offer are:

1. A senile lens, however small the opacity may be, is coherent enough to admit of an easy extraction *in toto* by the proper method.

2. To wait for the so-called maturity is unnecessary. The operation can be performed as soon as the sight is impaired to such a degree, that the vocation or comfort of the patient is interfered with.

3. All operative procedures for artificial ripening are unnecessary and contraindicated, exposing the eye to a two-fold danger.

EXCISION OF THE TARSUS FOR EXTREME NON-CICATRICAL ECTROPIUM OF THE LOWER LID.¹

BY A. E. PRINCE, M.D., SPRINGFIELD, ILL.

I OFFER for your criticism to-day a very simple expedient for the correction of a deformity which presents itself in cases of extreme non-cicatricial ectropium of the lower lid. This condition arises most frequently in elderly individuals, having tear-duct obstruction, associated with a general relaxation of the skin and mucous membrane. The frequent repetition of the act of wiping away the tears encourages the development of an ectropium which, when established, is aggravated by exposure to the air. Continued irritation causes the conjunctiva to swell, forcing the lid still further from its normal position, until finally, the eversion is complete. The mucous surface often appears extremely angry, red, and even granulous, giving rise to the term ectropium sarcomatosum. In the incipency of the development of the condition, it is sufficient to restore the drainage of the lachrymal duct, and cause the patient to massage the lid with vaseline by means of an up-

¹Read before the Third Annual Meeting of the Western Ophthalmological and Oto-Laryngological Association, held at Chicago, Ill., April 7-8, 1898

ward and inward stroke of the fingers. Caution him against the application of the handkerchief in such a manner as to increase the tendency towards eversion.

When the condition has progressed beyond this point, the conjunctiva becomes hypertrophied, and the tarsus becomes misshapen and ceases to afford any support to the lid. The palpebral surface becomes callous, and the function of the Meibomian glands is ultimately destroyed. The patient presents the hideous appearance so often seen among the "blear-eyed" beggars of the Orient, but fortunately, comparatively seldom met with among even the neglected poor of our own country.

To correct this deformity, Snellen has suggested a form of suture familiar to all of us, by which he attempts to draw the lower cul-de-sac downward, and secure it to the skin of the cheek. The results of this operation are not satisfactory. The Tarsorrhaphy, Dieffenbachs' operation, Adams' operation and von Graefe's operation, I have employed at various times in the commencement of my practice.

They all have the effect of shortening the lower lid, and improving the condition, but it has been my observation in my own cases, that when the ectropion is extreme, the results obtained from any of the above procedures, are not always satisfactory.

Of the operations above mentioned, I prefer that of Adams, which consists of excising a V-shaped piece extending through the skin tarsus and conjunctiva. Such a wound must be treated with great care, to secure union by first intention. Should the union not occur, malformation of the margin would be the almost inevitable result.

The case which led me to deviate from the above classical lines, is that of an old gentleman who consulted me about fifteen years ago, on account of senile cataract. The tissues about the eyes were all relaxed, and the mucous membrane was very much irritated by the exposure. The tears flowed constantly over his cheeks, owing to the malposition of the lids. There seemed to be no retro-tarsal fold of the lower lid. The version was complete. There was no cicatrization of the skin of the lid, and the whole difficulty had arisen from the relaxation of the palpebral structures. His arteries were atheromatous, and I feared that an attempted Adams' opera-

tion might result in a condition which would not improve the chance of a cataract extraction.

While studying his case, the idea of excising the tarsus presented itself. This operation I did on the lower lid of each eye. The result following the removal of the tarsus was more satisfactory than I had anticipated. All of the ectropium disappeared. The requisite lateral cicatrization occurred during the process of healing, thus shortening somewhat the lid, and assisting in holding it in contact with the cornea. I thought at first that an entropium might be the result, but no lashes touched the cornea, and in three weeks from the date of operation one would scarcely have known that anything had been done. My gratification was increased by a successful extraction of the lens at a later date.

I was so well satisfied with the result of this operation that I decided to repeat it, should a similar case present itself.

The result of the second case was as gratifying as the first, and from that date to the present time, with one exception, I have done no other operation for complete ectropium of the lower lid, not due to cutaneous cicatrization.

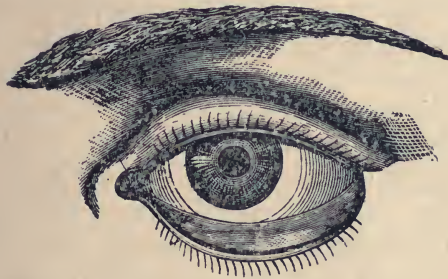
In the exceptional case, I made an Adams' operation. The results were satisfactory to the patient, but a slight irregularity in the margin of the lid remained, which led me to think better of the tarsus excision.

The operation, as I perform it, consists of slitting the canaliculus, and making an incision in the conjunctiva about 1 mm. removed from the opening of the Meibomian ducts, carrying this incision the whole length of the palpebral aperture vertically through the conjunctiva and tarsus by means of a Graefe knife. From the middle portion of the tarsus, the conjunctiva is then separated for a few millimeters, after which the tarsus is divided. Each free end is now grasped in turn by means of a forceps, and dissected out to its extreme limits, care being exercised not to excise any conjunctival tissue. Stevens' tenotomy scissors is the best instrument to use for this purpose. No sutures are found necessary. A bandage is applied to be worn for a few days. Direction is given to massage the lid with vaseline, in an upward and inward direction.

In the absence of general anæsthesia, it will be found best to inject a 4 per cent. solution of cocaine underneath the tar-

sus and apply a 16 per cent. solution to the conjunctiva by means of a cotton applicator.

The permanency of the operation may be illustrated by the case of Mr. William Coleman, of Beardstown, Ill., who came to me about ten years ago, suffering with extreme ectropion of the right lower lid and obstruction of the tear-ducts. The case was very much aggravated by frequent applications of his handkerchief and presented a distressing appearance. A 4 per cent. solution of cocaine was applied to the mucous surfaces and an 8 per cent. solution was injected underneath the skin. A longitudinal incision was made through the tarsus close to the openings of Meibomian ducts. The tarsus was then divided and each half dissected out with delicate scissors. He returned home the next day.



The continuous line in the cut represents the incision through the conjunctiva and tarsus. The dotted line indicates the division of the tarsus underneath the conjunctiva after which each half is to be grasped by means of forceps and dissected out to its extreme limits.

Since that time I have seen him on various occasions. The lid has remained in position and the margin of the lid has appeared normal. On March 14, 1898 (last month), he returned to me on account of an ectropium of the left lower lid, which had developed during the past year. The condition was not so bad as that of the right eye had been. I subjected him to the same operation. I saw him on the following day, when the apposition of the lid to the cornea was found to be satisfactory.

A case which I hoped to be able to present to you in person is that of Mr. J. W. Clodfelter, of Hillsboro, Ill, aged 70 years. He came to me on October 1, 1897, with complete eversion of the lower lid of the left eye. This condition had existed for several years. The conjunctiva was congested and

hypertrophied from the atmospheric exposure and applications of the handkerchief to remove the tears which gathered in the eye. He had had no treatment of a surgical character. All local applications which he had employed from time to time had been of no avail.

He preferred not to take an anæsthetic, and accordingly I made a hypodermic injection of a 4 per cent. solution of cocaine between the tarsus and skin of the lower lid, and applied a 16 per cent. solution to the mucous membrane. The bandage was continued for two days, when the case was discharged well. After two weeks he reported as follows: "The lids are in position, and I feel greatly benefited." On March 18, 1898, six months after the operation, I saw him, and the result remained perfect.

The futility of non-surgical treatment in these cases is illustrated by the case of Mr. L. J. Brown, of Nokomis, Ill., who was treated for three months at the Illinois Charitable Eye and Ear Infirmary, on account of ectropium of the lower lids, to get him ready for a cataract extraction. He was called home on account of sickness in his family, and subsequently was brought to me. I excised the lower tarsus, and a week subsequent extracted the cataract, with a good result.

The objections to this operation which may be urged are two, viz., (1) the Meibomian glands are destroyed, and (2) the removal of the tarsus takes away the vertical support to the margin of the lids.

To the first objection I will answer, that while it is theoretically well-founded, I have seen nothing of a practical character which makes me consider that it has any ground which entitles it to recognition. The second objection is not a statement of fact. The margin of the lid is supported by the commissures, and the lateral contraction in the course of healing has seemed sufficient to insure the apposition of the margin of the lid to the surface of the cornea without exercising any undue pressure.

It is obvious that the operation is not indicated in cases of minor degrees of displacement; likewise, it is useless in cases of cicatricial ectropium; but if tried in properly selected cases, the practical results will be sufficiently satisfactory to insure its repetition.

CENTRAL AMBLYOPIA IN A DYE-WORKER
PROBABLY PRODUCED BY INHALATION
OF THE ANILINE DYES.¹

BY CLARENCE A. VEASEY, A.M., M.D., PHILADELPHIA, PA.,

ADJUNCT PROFESSOR OF DISEASES OF THE EYE, PHILADELPHIA POLYCLINIC—
DEMONSTRATOR OF OPHTHALMOLOGY, JEFFERSON MEDICAL COLLEGE.

IN connection with the other cases of visual disturbance reported this evening, the notes of the following somewhat unusual case may be of interest.

A. G., a male, aged 53 years, was referred to me on July 1, 1897, by Dr. W. W. Keen for an examination of his eyes. His vision had been gradually failing for about two months, having been first observed as a slight "fogginess," and during the three weeks prior to the examination had become much worse. The patient himself volunteered the statement that he was not troubled so much because he could not see objects, but because they always appeared to him as if seen through a "dense fog." Two years before the patient came under my observation, there had been a right facial paralysis, but the recovery had been complete with the exception of a slight weakness of the orbicularis palpebrarum, which caused a moderate degree of ptosis at times. There had never been diplopia, and the pupils were equal in size, 4 mm in diameter, and normal in their reactions. There was a small pterygium on the nasal side of each eye.

The patient was tall and exceedingly thin, and looked as if the process for the assimilation of food was but improperly effected—in fact, the general appearance was that of a man suffering from malignant disease. He had lost nearly all of his teeth, and there was some ulceration of the buccal and nasal mucous membranes which was afterwards ascertained to have been produced by the action of bichromate of potassium. There was no history of the use of alcohol, and tobacco was employed only in moderate quantity, about one ounce of mild

¹Read in the Section of Ophthalmology of the College of Physicians of Philadelphia, April 19, 1898.

smoking tobacco being used in a week. Specific history was denied.

The visual acuity of each eye equaled $\frac{5}{32}$, and there was no further impairment of accommodation than was usual for his age, nor was there any muscle imbalance. With the following correction vision in each eye equalled $\frac{5}{V}$ but was very foggy.

O. D. + S. 1.25 D. \ominus + C. 75 D. ax. 165° .

O. S. + S. 1.25 D.

The ophthalmoscopic examination revealed clear media, oval discs with the edges everywhere veiled, veins exceedingly full but not tortuous, arteries nearly normal, some thickening of the fiber-layer of the retina immediately surrounding the discs, but no hæmorrhages—in other words, a low-grade optic neuritis.

The visual fields, as shown in the diagrams, were concentrically contracted for form and colors, a small green field,

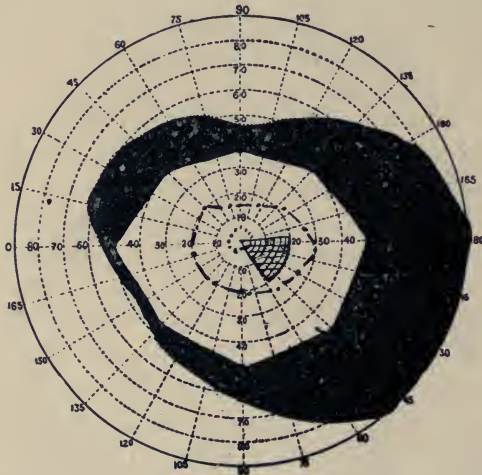


FIG. 1.—RIGHT EYE.

however, being preserved. There was a large fan-shaped central scotoma for red and green in each eye, in the right extending outward, and somewhat upward, 20° from the fixation point and downward to the same extent, occupying nearly a quadrant of the central area of the field. That of the left eye was about 20° smaller. The size of the scotomata appearing somewhat incompatible with the visual acuity as obtained

through the correcting lenses, the fields were carefully taken several times with the same result from each examination.

In seeking the cause of the above described condition, it was found that the patient had been a worker in dye works for twelve years and that during the last seven years of this time he had been what is known as a "weigher." It was his duty to weigh and dispense the different ingredients from which the dyes were mixed and in doing so he was obliged to remain in a small room with comparatively no ventilation for two or more hours every day. There was a considerable amount of dust consequent upon the handling of the chemicals which kept the atmosphere in the room, according to his expression, "as thick as smoke," and the inhalation of this produced symptoms so severe at times that he almost choked.

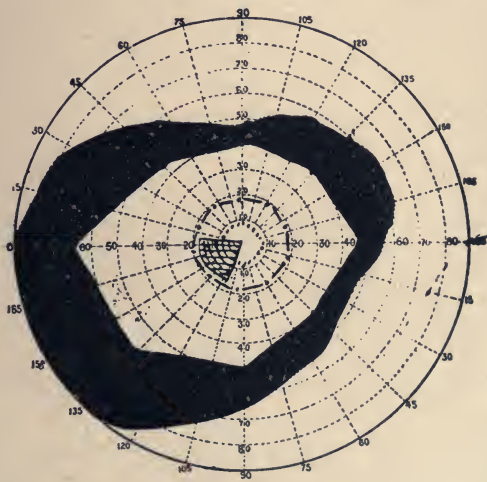


FIG. 2.—LEFT EYE.

Careful inquiry elicited the fact that the following chemicals were employed: Chloride of ammonium, carbonate of sodium, sulphate of copper, sulphate of iron, bichromate of potassium, chlorate of potassium, and the aniline salts.

So far as could be ascertained there has been no record of any case of central amblyopia produced by any of the above chemicals excepting the last, and it is difficult to understand in what manner they would do so except with chlorate of potassium, from which the possibility of an amblyopia arising

through a coexisting nephritis has been suggested by Knies² and others, though no cases are recorded. In my own case the urinary examination was negative.

Mackinlay³ records a case, however, among workers in the aniline dyes in which there was marked pigmentation of the cornea and conjunctiva and reduction of the visual acuity, though the condition of the cornea was such that no view of the interior of the eye could be obtained. Other cases have been reported in which, aniline existing as an impurity in nitrobenzol, the symptoms have been a moderate disturbance of central vision, accompanied by a form of retinitis with distended veins, discoloration of the eye-grounds and a few hæmorrhages.

From these observations it seems probable that it was the aniline that gave rise to the toxic symptoms in my own case. It is believed that most of it entered the system by way of the respiratory tract though some, to be sure, may have entered through the skin. Be this as it may, the employment of a respirator during the period of work and the internal administration of the sulphate of strychnia caused amelioration of the symptoms in two weeks' time, the patient stating that the fog had become much less dense.

It is a matter of some regret that it has not since been possible to examine the condition of the eye-grounds or to take the visual fields, though a letter from the patient received within the past week stated that he was so much improved that he did not think it necessary to come to see me again.

²Quoted from de Schweinitz's "Toxic Amblyopias," Philadelphia, 1896.

³Quoted by Casey Wood, "The Toxic Amblyopias," *Annals of Ophth. and Otol.*, 1892-94. *Trans. Ophthal. Soc., United Kingdom*, 1886, p. 144.

EDITORIAL NOTICE.

The transcription of the shorthand report of the discussions following the original papers read at the meeting of the Western Ophthalmological and Oto-Laryngological Society has only just now come to hand. We will publish it in subsequent numbers.

CORRESPONDENCE.

VISION OF RECRUITS.

WASHINGTON, D. C., April 20, 1898.

DR. L. R. CULBERTSON, Zanesville, Ohio.

SIR—I am directed by the Surgeon-General to acknowledge receipt of your inquiry of the 18th inst., and to reply as follows:

Applicants whose eyes exhibit refractive errors requiring glasses for their correction should not be accepted for the line of the Army. Slight visual defects which, in the opinion of the examining officer, will not disqualify for service in the line, may be waived; but the same should be noted on the form for the physical examination of the recruit.

Color-blindness is not a cause of rejection, but it likewise should be noted on the form.

Applicants may, however, be enlisted in the Hospital Corps who are subject to refractive errors of vision, provided these errors are not excessive, may be corrected by glasses, and are not progressive or accompanied by ocular disease. Nor do such defects disqualify candidates for appointment in the medical department.

Conjunctivitis, or other disease of the eye, if a temporary ailment and susceptible of speedy cure without injury to vision, does not disqualify, but it should be noted on the examination form.

Respectfully,

C. G. SMART,

Deputy Surgeon-General, U. S. Army.

The foregoing letter from the Surgeon-General, U. S. Army, gives the rules to be followed. During the Civil War a great many men were enlisted who had defective sight and disease of the eyes. The wisdom of a rigid eye examination can be readily seen. Civil surgeons, unless oculists, and some army surgeons are incompetent to make a perfect eye examination, and for this reason diseases of eyes that may have existed before enlistment will be attributed to the service when applying for pension. The examiner should know whether an eye is glaucomatous, or if there is any old choroiditis or retinitis, etc.

SOCIETY PROCEEDINGS.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

H. R. SWANZY, FR.C.S.I., President, in the Chair.

THURSDAY, MARCH 27, 1898.

The Aseptic Treatment of Wounds in Ophthalmic Surgery.
This paper was read by DR. A. MCGILLIVARY. After referring to the changes in the treatment of wounds brought about by Lister, the author went on to speak of recent modifications in method. These modifications consisted chiefly in reducing the strength of the antiseptic solutions used for douching purposes, and the adoption of heat sterilization for instruments and dressings. But when the importance of the natural antiseptic property, or natural immunity, of living tissues came to be more appreciated, some surgeons discarded chemical antiseptics in operations altogether, on account of their deleterious action on the tissues of the wound, and adopted sterilized physiological saline solution, as it produced no irritation, but tended to keep the tissues as nearly as possible in their physiological condition. Antiseptic solutions, however weak, irritated or benumbed the cut tissues of a wound, and thus their natural immunity became impaired. But the antiseptic solutions employed during operations had no germicidal properties unless when kept in direct contact with the micro-organisms for several hours or even days—a very undesirable procedure even if possible—so that their action was purely mechanical, and, so far as the removal of micro organisms was concerned, was limited to those on the surface, just as in the case of douching with normal saline solution. The position, then, of the aseptician and antiseptician was perfectly clear. The aseptician, by employing normal saline solution for douching purposes, and studiously preventing any chemical antiseptic from

coming in contact with the wound, trusted to the inherent antiseptic properties of the tissues themselves in warding off or destroying any micro-organisms that might have been left in, or that found access to, the wound subsequently. The antiseptician, on the other hand, by employing antiseptic solutions, impaired or destroyed the natural antiseptic property of the tissues, so that they were thus less able to cope with micro-organisms. A description of the operation for the removal of senile cataract was taken to illustrate aseptic technique in ophthalmic operations. From the time the patient entered the hospital till he was discharged, no antiseptic was allowed to come in contact with the eye. The patient's face was carefully washed on the morning of the operation with warm water and soap, special attention being paid to the folds of the eyelids. The eyelashes were cut short, so as to allow the margins of the lids to be more easily treated and to prevent the eyelashes from coming in contact either with the instruments or with the wound during the operation. By means of a special douche the conjunctival culs-de-sac were flushed with sterilized salt solution (6 per cent). The eyelids were in turn everted so as to allow their conjunctival surfaces to be carefully cleansed. This was of the utmost importance, as the conjunctival surface of the upper lid was the innermost, and therefore the most important, part of the dressing. After applying the speculum, the part of the eye corresponding to the wound was again douched, and the patient enjoined not to rotate the eye upwards till the operation was completed, so as not to allow the wound to come in contact with the margin of the eyelid for fear of contamination. Mechanical cleansing of the conjunctiva with a mop was soon discontinued, as it produced undue irritation. All instruments, lotions, mops, and dressings were sterilized by heat, so that everything that touched the eye was aseptic. Before removing the speculum the eye was douched with a gentle stream of salt solution, the solution being allowed to play over the wound to remove any cortical or capsular débris. Some of the solution invariably found its way into the anterior chamber, and was valuable in removing soft lens matter without causing any irritation. The dressing consisted of a piece of moist lint applied next to the eye, and one or two thin layers of absorbent cotton wool, the whole being kept in position by means of a vertical and horizontal strip of adhesive rubber

plaster; only the eye operated on was covered. Throughout the operation, and also during the preliminary treatment, every attempt was employed to avoid irritating the conjunctiva as much as possible, because conjunctival irritation produced hypersecretion; for the nearer the conjunctiva was to its normal condition the better for operative interference. Our motto in dealing with the conjunctiva should be: "Let sleeping dogs lie."

MR. ARNOLD LAWSON had just completed the bacteriological examination of 96 apparently normal conjunctival sacs. In only two cases had he been able to find pathogenic organisms, the staphylococcus pyogenes albus; several non-pathogenic staphylococci were found, but these were all harmless. He had not found the streptococcus at all. He therefore did not consider that it was correct to say that the normal conjunctival sac was a receptacle for micro-organisms.

MR. MACKINLAY always boiled his instruments, and used saturated boric acid lotion for the eye during operations.

DR. BRONNER considered that it was not possible to make the conjunctival sac aseptic, therefore antiseptics were necessary; he always put his knives into absolute alcohol before using them. He believed that cocaine by its action on the cornea favored suppuration.

MR. BICKERTON always boiled his instruments before the operation and again after using them. He irrigated the eye with perchloride 1 in 5,000. He had only seen two cases of suppuration, and both were in hospital practice.

Ophthalmoscopic Evidence of General Arterial Disease.—

MR. MARCUS GUNN read this paper. After referring to a case which he had shown to the Society some years ago, he went on to describe the appearances seen in the arteries affected, as part of a change in which the arteries of the body generally and of the brain in particular shared. The general reflex from the vessel was brighter than normal, the central light streak was bright, and the whole artery was of a lighter color than normal. This was due to a hyaline change in the arterial walls; as a consequence of this change the circulation in the veins was impeded, and in some cases the vein became invisible where crossed by an artery. As a further result of this venous obstruction, there was set up an œdema of the retina, which

might be either general or partial, the effect of which was to blur the details of the fundus. In some cases the size of the arteries was not uniform, the vessel would be narrowed at one spot or increased in a certain part of its course; this change was most often seen in the small arteries in the region of the macula. The arteries were sometimes very tortuous. The central streak was narrow, bright, and with points of greater brilliance in it; this condition was also seen in hypermetropia, and after optic neuritis in the vessels arising from the optic disc, but in diseased vessels it was those of the second and third magnitude which should be looked at. There was a loss of translucency of the arteries, so that where the vein passed behind the artery it could not be seen. On the other hand, if the vein covered the artery, the artery could be unduly seen through the blood column in the vein, because of the thickening of the arterial coat, and partial emptying of the vein by the thickened artery as the two crossed each other. As a consequence of the hardness of the arteries, there was an interruption of the venous current, the vein was distended, and often hæmorrhages took place along its course. The change in the arteries was a change in the coats, an irregular thickening; with this there was a loss in carrying power, and hence tortuosity. The change in the veins was due to the damming back of the blood; the walls of the veins and capillaries underwent degeneration, hence arose the hæmorrhages. The question of etiology was one for the physician. The change usually occurred between 40 and 50. If well marked at this age the prognosis was grave. The patients had often been subject to migraine, indigestion, and gout. Chronic alcoholism was also a factor in the causation. In some of the cases known as hæmorrhagic glaucoma this affection of the vessels was the cause of the change which gave rise to the hæmorrhages. It was in close association with renal disease, but the vessels of the eye and brain might be affected before the kidney. He had examined the eyes of all the patients in the National Hospital at one time who had had hemiplegia. In 7 the arteries were normal, in 10 they were affected, and in 7 the changes were quite characteristic.

Remarks were made by Drs. JAMES TAYLER, ALDREN TURNER, BRONNER, and MR. MACKINLAY; and MR. GUNN replied.

BOOKS AND PAMPHLETS.

DIE BEDEUTUNG DER AUGENSTOERUNGEN FUER DIE DIAGNOSE DER HIRN- UND RUECKENMARKS-KRANKHEITEN. (THE VALUE OF EYE-AFFECTIONS IN THE DIAGNOSIS OF CEREBRAL AND SPINAL DISEASES). By DR. OTTO SCHWARZ. Berlin: 1898, S. Karger. Price, 2.50 marks.

This is a most complete and pre-eminently practical manual. Every page of it shows the author's careful study of the subject and a large personal experience. The book is so arranged that it is easily used as a book of reference and should have a wide circulation. We should think its translation into the English language would well repay the enterprise.

ON PARTIAL, STATIONARY CATARACTS. By HUGO WINTERSTEINER, M.D. (20 colored plates), and DIE ENTWICKELUNG DES AUGES (DEVELOPMENT OF THE EYE). By DR. A. E. FICK (9 colored plates). Breslau: J. N. Kern. New York: Lemke & Buechner.

These are Nos. XI and XIII of the collection of ophthalmic plates for teachers, edited by Prof. H. Magnus, of Breslau. Not only these two numbers, but all of them which have come to our personal knowledge, deserve only the highest praise. We are glad to see No. XI in the English language and hope to see them all translated. ALT.

PAMPHLETS RECEIVED.

- "Pelvic Surgery," by A. V. L. Brokaw, M.D.
- "Conjunctival Opacity of the Cornea," by Dr. H. Moulton.
- "My Recent Work in Appendicitis," by Dr. A. C. Bernays.
- "Two Unusual Cases of Strabismus," by Dr. F. W. Marlow.
- "An Exhibition of Radiographs," by Dr. A. V. L. Brokaw.
- "Recurring Internal Ophthalmoplegia," by H. F. Hansell, M.D.

"Natural Gas and Eustachian Inflammation," by J. J. Kyle, M.D.

"Four Recent Cases of Excision of the Malleus, etc.," by Ch. H. Burnett, M.D.

"Anomalies in the Functions of the Extrinsic Ocular Muscles," by F. Buller, M.D.

"Aqueous Extract of Suprarenal Capsule in Ophthalmic Practice," by J. J. Kyle, M.D.

"Shall We Operate Through the Upper or Lower Canaliculus," by S. C. Ayres, D.M.

"The Surgical Treatment of Acute Inflammation of the Middle Ear," by E. B. Dench, M.D.

"Notes Upon Some Low-Toned Tuning Forks for Clinical Purposes," by E. D. Spear, M.D.

"Intra-Tympanic Surgery; Especially in Chronic Purulent Otitis Media," by Ch. H. Burnett, M.D.

"Chronic Tympanic Vertigo; Its Cure by tympanotomy and Removal of the Incus," by Ch. H. Burnett, M.D.

MISCELLANY.

BACTERIA IN THE NORMAL CONJUNCTIVA AND THE EFFECT UPON THEM OF ASEPTIC AND ANTISEPTIC IRRIGATIONS. THE STAPHYLOCOCCUS EPIDERMIDIS ALBUS (WELCH) A REGULAR INHABITANT OF THE NORMAL CONJUNCTIVA.—As a result of a series of experiments upon one hundred individuals, DR. A. L. RANDOLPH, of Baltimore (*Archives of Ophthalmology*, Vol. xxvi, No. 3, 1898), concludes as follows:

1. The normal conjunctiva always contains bacteria. Of these the staphylococcus epidermidis albus is found with such frequency that it must be regarded as a regular inhabitant of this situation. This coccus and probably other bacteria found in this locality are usually of only slight if any pathogenic power. It should be remembered, though, that bacteria, ordi-

narily non-pathogenic, may become harmful under certain favoring conditions, such as the bruising of the tissues by instruments or the irritation resulting from chemical substances.

2. Neither the irrigation with sterilized water nor the instillation of a sublimate solution (1 : 5000) produces sterility of the conjunctiva, and inasmuch as both measures are futile and possibly harmful they may just as well be abandoned. These methods of sterilizing the conjunctiva are the ones usually employed by ophthalmologists, and hence the choice of them for testing this question.

The most important essential of a germicide which is to be used upon the conjunctiva is that it be absolutely free of irritating properties, and, furthermore, it should be demonstrable that this germicide will destroy the germs most commonly met with in the normal conjunctiva. It goes without saying that an antiseptic which has these qualities would be indispensable in all operations on the eye.

3. In operating upon the normal conjunctiva, as in cataract operations, the surgeon in the present state of our disinfecting armamentarium would do well to consider the subject of antiseptics and asepsis chiefly, if not solely, in connection with the hands, instruments, cocaine, and atropine.

ANOTHER IMPORTANT ADDITION HAS BEEN MADE TO OUR KNOWLEDGE OF THE RETINA BY RAMON Y CAJAL. He has made out that the cones are to be considered from the histogenetic standpoint as a more highly-developed form of the rods. This works to the favor of those theories of the sensation of light which regard the color-sense of the cones as being the result of a gradual development out of the achromatic sensation furnished by the rods. According to some observers, the cones in the periphery of the retina resemble the rods very much in appearance; if it could be made out that in the dichromatic retinal zone (the zone in which reds and greens are not perceived) there is an intermediate form of cone (a form with only a few basilar threads, for instance), that would also be a fact of much theoretical interest. The histologists would do well to investigate the question with more care than has yet been done, and with modern methods.—*Science*.

THE AMERICAN JOURNAL OF
OPHTHALMOLOGY.

VOL. XV.

JUNE, 1898.

NO. 6.

ORIGINAL ARTICLES.

THE SCIENCE OF OPHTHALMOLOGY.¹

BY DUDLEY S. REYNOLDS, A.M., M.D., LOUISVILLE, KY.,

PROFESSOR OF OPHTHALMOLOGY, OTOTOLOGY, AND MEDICAL JURISPRUDENCE IN THE
HOSPITAL COLLEGE OF MEDICINE, MEDICAL DEPARTMENT OF THE CENTRAL
UNIVERSITY OF KENTUCKY, — SURGEON TO THE EYE AND EAR DEPART-
MENT OF THE LOUISVILLE CITY HOSPITAL, — SURGEON TO
THE GRAY STREET INFIRMARY, ETC.

THE science of ophthalmology is in great danger of becoming tainted with loose methods of approximation. It is related of Friar Bacon, who invented spectacles, that he ground his own lenses. Kepler, to whom the world is indebted for many discoveries in astronomy, elaborated and simplified the methods of grinding lenses, and they came at once into general use. The original plan was based upon the idea that the maximum angle of refraction in a spherical body expressed the unit. The quadrant of the sphere being the unit, had its focal length in the radius, minus the interruption of the passage of light through the lens, this being great or small, according to the index of refraction of the media used for making lenses. If the radius of the sphere from which the

¹Read before the Third Annual Meeting of the Western Ophthalmological and Oto-Laryngological Association, held at Chicago, Ill., April 7-8, 1898.

unit was derived were twelve inches, the focal length of the unit would be twelve inches, minus the resistance of the medium to the passage of light. For spectacle lenses, the radius of the unit, it has been agreed, should be one inch, or twenty-five millimeters. Now, if we adopt the English inch, the French inch, or the Prussian inch, all of which are materially different, we should, of course, have the lenses in these systems made of fractional parts of the unit, and as this is the quadrant of a sphere, focal lengths would have to be measured by the same system of determining the radius; and so it was, in former times, the custom of the English speaking people, the French, and North Germans, to employ systems peculiarly their own.

In an attempt to popularize this branch of science, and to give it common characters which would be acceptable to all nations, the International Ophthalmological Congress of 1867, on motion of Professor Javal, appointed a committee to investigate the merits of the different systems of grading lenses, and report some method which should be universally acceptable. That committee fixed upon the plan of grading lenses by focal lengths, and established the meter as the unit of measure, and fixed the whole series required for a complete case of test lenses with definite inter-focal spaces. It had already been noted that, in the fractional system of gradation, although based upon the radius of curvature of the refracting surface, the lenses were required to exhibit uniform refracting power, and as different media were employed for making the lenses, and different units of measure to determine their radii, constant disparity appeared in the results of their application. The eyes of persons having but slight errors of refraction, and especially in cases of astigmatism, refused to be comforted by the best directed attempts at correcting their refraction, and so, Giraud-Teulon conceived the difficulty must be in the ocular muscles. He practiced decentering the lenses, and claimed great advantage from their use.

In 1868, Dr. Hermann Scheffler concluded, from the favorable reports of the use of decentered lenses, that each lens should be made periscopic, in order to measure uniformly the whole outer field of vision. His work on the "Theorie der Augenfehler und der Brille" presents a thoroughly scientific analysis of the refracting powers of prismic, spheric and cylin-

dric bodies, separately, and in combination, in their varied application to the correction of errors of refraction in the eye.

Paetz and Flohr (Berlin), practically abandoned the radius of curvature, and introduced a series of test lenses graded by focal lengths, adopting the Prussian inch as the standard. The prismic base of each lens in the series constituted an orthoscopic combination. The prisms were designated in degrees, minutes, and seconds, according to the angular deviation of the light passed through them. This, it was supposed, would yield such precisely accurate results in grinding lenses as to enable the optician to give each of them the proper periscopic form. Then it became necessary to still have recourse to the capacity of the eye to unite parallel rays of light in a uniform angle to determine at the same time their acuity of perception.

With the definite sized test letters of Snellen came a uniform distance for positive infinity, or parallel light. Now, if the Prussian inch determined the unit of refraction in the lenses, it is manifestly clear the Prussian linear measure must be employed to fix the point of positive infinity. As Snellen constructed his test lenses at first, upon the basis of English measure, it is natural that great dissatisfaction in France and Germany should have arisen upon the adoption of a system foreign to their own.

When the metric system of gradation was finally agreed upon, Snellen re-calculated the relations in the size of his test letters for the new point of positive infinity, fixed at six meters. However much we may incline to criticise the want of accuracy in the methods of grinding lenses, and the merits of the meter as a unit of measure, we must allow that its adoption necessarily does away with a large percentage of those errors incident to our former lack of uniformity in the units of measure.

Inasmuch as the distance at which the test object is placed for measuring the capacity of the eye to unite parallel rays of light has been fixed at six meters, and the relative acuity of vision is expressed in angular measure, it is manifestly clear that neither more nor less than six meters shall be employed to represent the distance, and that no other terms than those of the relative angle of visual perception shall be used to record the result. Neither vulgar fractions should be employed, nor any inharmonious system of notation.

Of the scientific toys designed to afford cheap and easy methods of evading the exacting demands of the details of a circumstantial analysis, not one of them can do away with the necessity for an accurately graded series of test lenses, the complete suspension of the accommodation of the eye to be tested, and the geometrically graded test objects, placed at the point of positive infinity.

It will not do to say that David O'Flaherty, with accommodation suspended in his right eye, sees with $+ 2.00 D. = \frac{1}{V_1}$ of normal; yet this is a good illustration of a very common mode of expression. A very valuable contribution on the clinical uses of certain cycloplegics is marred by the statement of a metrical lens required to secure vision $= \frac{20}{XX}$.

The science of ophthalmology can not be preserved in its concrete form if such matters as these escape our attention. It is not to be wondered that disappointment so frequently follows loose methods of analysis as to lead both patient and practitioner astray in searching for causes of pains and aches that refuse to yield to the supposed correction of errors of refraction.

The decentered lens and the prism have seized upon the minds of some, whilst others have apparently gone daft in their search for ocular tendons to cut, or advance. An enthusiastic surgeon has recently reported his achievements in the looping of ocular tendons with catgut ligatures. Our confrère, Dr. Geo. T. Stevens, has created an apparently rational place for partial tenotomy; but it is not an uncommon occurrence to read of a dozen or more tenotomies, or advancements of the tendons in a single eye. With the tendon looped, muscular co-ordination in the movement of the eyes might, in all probability, be expected to observe not alone the lateral, the vertical, and the rotary movements, but, like the famous gun with the curved barrel made to shoot bears behind trees, turned in all sorts of irregular directions to compensate for the eccentricities of opposing tendons.

A fine illustration of the results of painstaking practice is presented in the person of Mrs. T., aged 30 years, the wife of a prominent practitioner in Louisville. She came to me on October 19, 1896, with divergent squint, photophobia, indistinct vision for distance, and total inability to read. She had suffered almost continuously with sick headache for a long

time, and having been told that the ocular tendons must be advanced, her husband brought her to me with the object of having whatever operating was found necessary done at once. On attempting to suspend accommodation I found she had unsteady muscular movements, the rotary muscles being in an almost constant state of activity. Without glasses she saw nothing; with the glasses she had she saw $\frac{6}{xxxvi}$ Snellen, with the right eye, and $\frac{6}{lx}$ with the left eye. On examination of the glasses I found for the right eye she had $-0.75c.$ axis 170° \bigcirc $-0.75s.$ combined with a prism of 3° base inward. In the left eye she had $+2.00c.$ axis 110° \bigcirc \square $-3.50c.$

I prescribed homatropin drops, to be instilled twice daily, and directed smoked coquilles to be worn constantly, and no attempt to be made to see objects, excepting for purposes of going about. She went to the country and remained until April 30, 1897. When she returned the eyes were re-examined, under homatropin, the use of which had been kept up during her entire absence. I found $+1.00c.$ axis 90° enabled the right eye to see $=\frac{6}{vi}$ Snellen; $+2.00c.$ axis 90° enabled the left eye to see $=\frac{6}{vi}$ Snellen. These glasses were prescribed and she has worn them constantly ever since. She is fond of reading, and having no children, has spent the past year in almost constant reading, with not more than two attacks of headache during the entire year, both of these clearly due to indigestion. The glasses she had formerly worn were chosen after a most painstaking and thorough analysis with the Javal-Schiötz ophthalmometer, the ophthalmoscope, and the DeZeng refractometer, in the hands of an experienced practitioner. It may be remarked that she narrowly escaped a series of tenotomies and advancements.

The great point to be considered is, that sufficient care should be taken to establish complete suspension of accommodation, and no final attempt to determine the state of refraction should be made for persons whose general health is such as to disqualify them from engaging in the normal use of the eyes. Proper discrimination in these matters, and a judicious course of constitutional treatment necessary to restore the patient's general health are too often overlooked or neglected.

I had intended to take an entire hour for the presentation of my subject, but your committee politely informed me, that there were others at this meeting prepared to illuminate a va-

riety of subjects, and reduced my intended great luminary to this small tallow dip.

HOMONYMOUS HEMIOPIA FOLLOWED BY TOTAL
LOSS OF VISION IN A CASE OF UTERINE
HÆMORRHAGE DUE TO FIBROID TUMOR.¹

BY A. R. AMOS, M.D., DES MOINES, IOWA.

MY main reason for presenting a paper under the above title is not so much to point out the relation of the uterine hæmorrhage to hemiopia or amblyopia, which is of sufficient frequency of occurrence not to require description in this body, but, rather because of the unusual phenomena presented in the case to be described, the nature of which is suggested in the title, and which I hope to bring out in this discussion.

The case is that of a woman, aged 50 years, who had always enjoyed good health previous to the onset of a uterine hæmorrhage which occurred nearly a year prior to any visual defect.

Questioning the patient, and physical examination revealed nothing of syphilis or tuberculosis, and no inherited tendency to brain affections. The uterine function, as stated, had always been satisfactorily performed until a year previously. During the period from the first hæmorrhage to the complaint of visual defect, her system had sustained frequent losses of blood from the uterus. The waste at first was not so great but that she was able to recover largely from one attack to the next, but gradually the increasing frequency and larger losses deprived the system of its recuperative power, leaving the relaxed vessels without power to restrain the frequently recurring blood torrent.

When seen by me about one year ago the blood showed no more than one-third the standard of red corpuscles. The features were pale, the patient extremely languid. A few days

¹Read before the Third Annual Meeting of the Western Ophthalmological and Oto-Laryngological Association, held at Chicago, Ill., April 7-8, 1898

previously she had complained of dizziness and headache, and quite suddenly lost the power to see objects situated on her right side; she could not see beyond the middle line.

An examination of central vision showed it to be above $\frac{20}{xxx}$ in both eyes. The perimeter revealed a full field on the left in both eyes as well as good color-sense, but visual perception from her right field was abolished. The pupil reflex and accommodative power were retained. Ophthalmoscopic examination negative. There was no apparent paralysis of other nerves. The patient was irritable and fretful. The extreme palor caused inquiries as to hæmorrhage and led to the history above stated.

Suspecting uterine tumor, she was at once referred to a surgeon, with the assurance that the eye affection resulted from loss of blood. I saw no more of her until December, 1897, when she returned, being led by her husband. She had lost the power of vision in the opposite side also, and could only distinguish bright lights.

It seems that she had received ineffectual treatment for some time, and, growing dissatisfied, had been taken to Chicago, where a uterine fibroid was removed by Dr. Etheridge which checked farther loss of blood. She states that up to this time the vision had remained about as when I had last seen her, but within three days following the operation she was again attacked with dizziness and became totally blind. She was then referred to Dr. Wear, who treated her for some time. Returning to me in December, an examination of the fundus showed a slight palor of optic discs, but no changes in the vessels. The pupil reflexes were still present, but the pupils somewhat dilated. Patient was peevish and appeared somewhat stupid and childish, but had quite recovered from effects of hæmorrhage. In correspondence with me Dr. Wear wrote that he believed it to be due to embolism, but the letter did not state whether embolism was within the arteria centralis or the cerebral cortex. In order to get more information, I asked her husband to take her to Dr. Voldeng, of my own town, who made the following report: "Total absence of evidence of involvement of other cranial nerves. The symptoms point to disease of posterior lobes."

At this time she had entirely recovered from the loss of blood, was vigorous but depressed mentally. At times, espe-

cially on bright days, she believed she could see a little, but could give no definite evidence of it.

Finally, at the time of writing, an examination gives the following results: Pupillary reflexes to light good, pupils normal width. The ophthalmoscope shows normal appearance of the fundus, with possibly a slight narrowing of arteries.

Moreover, it is found that central vision has so far returned that she reads Jaeger type, No. 1, at 14 inches, but only a letter at a time. When pointing to a letter with a pencil she is unable to locate it from the pointer unless the pencil rests on the edge of the letter. Withdraw it a trifle and she sees only the letter. By searching for some time she may be made to read the distant type, ²⁰/_{LXXX}, with each eye. Beyond this central point the eye seems as blind as ever.

Now, after this brief, but I hope sufficiently explicit narration of the phenomena, what explanation can we find for them? Certainly the facts upon which to base a diagnosis are meagre, and we shall have to use them carefully or incur serious risk of missing a correct conclusion.

In discussing the cause or causes the first thing to do, apparently, is to recognize it, if possible, as functional, or due to organic changes in some portion of the visual apparatus. The patient showed hysterical stigmata, but gave no history of hysterical seizures during her past life. Hysterical amblyopia in which the peripheral field is primarily involved or where this field rapidly disappears with simultaneous fading of the central field are the forms most commonly observed and described by writers.

Occasional cases have been reported with central scotoma which appeared to be of hysterical origin, but without having had an opportunity of a thorough search of the literature of the subject, I am not aware that the phenomena observed in these cases have ever been definitely ascribed to hysteria. Let us recall for a moment the symptoms: Homonymous hemiopia, loss of all sense of vision in one half of the field, coming on suddenly and without previous complaint or suggestion, and without narrowing of the other half or any serious, though some loss of central power, followed a few months later by similar loss in the other half with abolition of central vision. These facts, both in their character and relation, in time would, it seems to me, make it unnecessary to regard farther the cau-

sal relation of hysteria in this case. It seems out of the question. And yet there is a late symptom which we may adduce as farther proof of its non-causal character, to-wit: the gradual return of visual power recently noticed, but confined to a central region not larger than five degrees in diameter. Were it hysterical, we should rather expect some striking phenomena, or possibly a reversal of the symptoms, while here we have evidence of regeneration of injured nerve structure. Extreme anæmia of the retina not due to obstructive lesion of the nerve may be considered, but it seems to me only to be rejected. This might account for amblyopia but not for hemiopia. Moreover, at no time, while under my observation, did the retina appear in that condition.

Excluding, therefore, these conditions, it seems to me we are forced to assume a lesion of some part of the visual apparatus. Moreover, if we shall recall the fact that hemiopia occurred at a time of great anæmia due to severe and repeated hæmorrhages of the uterus, and that the total loss of vision followed closely after an operation in which the uterus was removed, and at which time there was probably further loss of blood, it seems altogether probable that on both these occasions thrombi formed in some of the vessels, and becoming detached, floated into the blood streams causing embolism of some of the vessels of some part of the visual apparatus. Besides, the suddenness of the attacks would point to such a cause, while the slight shock as manifested by dizziness and headache would not point away from it.

The absence of symptoms indicating lesion of other cerebral areas, as paralyses of nerves, throws but little light on the case, merely indicating the small area of tissue involved. The part and nature of that affected is not by this means shown, but the absence of other pathological manifestations has at least the negative value of not detracting from the force of the embolic theory.

Granting, therefore, first, a lesion and second an embolic lesion, what part of the visual tract is involved?

Dr. Wear, in his communication, almost led me to believe that he regarded it as a case of embolism of the arteria centralis retinæ of both eyes. If this were his opinion he must certainly have refused to believe that there had ever been any hemiopia, for embolism of the arteria centralis causing simul-

taneous loss of vision of one half of both eyes, while conceivable is altogether improbable. Moreover, even the facts which he was able individually to observe would make it extremely improbable that the lesion occurred in the optic nerves, since simultaneous involvement of both nerves would be of very rare occurrence. Besides, there are no ophthalmoscopic indications of degeneration within the eye, and even after more than a year no evidence of degeneration has traveled down the tracts from the original lesion showing itself in the disc.

Taking the facts together, we are safe in assuming that the lesion occurred at some point back of the commissure and that in the case of the first attack with blindness of the right visual field of both eyes, we had a lesion of the left cerebral hemisphere, and in the second attack, which brought on total loss of vision, a lesion of the right cerebral hemisphere.

Referring again to the early part of this paper, we found the pupillary reflex to light intact, equally in both eyes, and since the nerves carrying these impulses go out with the optic tracts from the primary optic centers, we are able to localize the lesion above the pulvinar and the corpora geniculata. The only other point outside the cerebral cortex which might be the seat of the lesion is the posterior part of the internal capsule. This we may reasonably exclude by the absence of paralysis of motion or sensation which might fully be expected in an embolism of this region.

By this process of exclusion we may conclude that emboli of the cerebral vessels occurred in the posterior lobe in the region of the cuneus, first on the left side and several months later on the right side.

After more than a year from the first attack and nine months from the last, we find a small central area of vision, equal to about $\frac{20}{LX}$ in both eyes, but with confusion of the color-sense, while beyond that point only an imperfect light-sense remains.

In conclusion, permit me to call attention to the following interesting points:

1. The two lesions occurring at different periods of time, and involving the same portion of each cerebral hemisphere—double homonomous lateral hemiopia.
2. While at first there was less of central vision as well as peripheral, regeneration of the area connected with the

macula lutea of one or both sides had taken place, leaving the other areas still involved.

CONJUNCTIVITIS DUE TO THE DIPLO-BACILLUS OF MORAX-AXENFELD.

BY ADOLF ALT, M.D., ST. LOUIS, MO.

A PAPER by H. Gifford in the *Annals of Ophthalmology* for April, 1898, in which reference is made to some cases seen by myself, prompts me to record them here. This seems to be more to the point, as the diplo-bacillus, so common, apparently, in some parts of Europe, has been as yet but rarely seen in this country. Gifford states, that Weeks, of New York, and myself are the only ones who have, besides himself, thus far met with this organism.

In the *Berliner Klinische Wochenschrift*, April 18, 1898, G. J. Schoute, of Leyden, takes pains to record one single case in order to show that that the Netherlands, also, know this pathogenic organism.

I have seen this germ first described by Morax and Axenfeld in three cases, which differed so much from the original description of the symptoms produced by the diplo-bacillus, as given by Morax, that I thought at first, that I had to deal with the bacillus of Friedländer. In this opinion I was the more strengthened by the fact, that the three cases came to me during a severe epidemic of pneumonia and close upon each other. However, I am now satisfied from the discoloration of the bacillus by Gram's method, that I had to deal with the Morax-Axenfeld diplo-bacillus.

Morax (*Annales d'Oculistique*, January, 1897) calls the conjunctivitis produced by this bacillus a *subacute* one, Axenfeld (*Berliner Klinische Wochenschrift*, September 27, 1897) calls it a *chronic* diplo-bacillus conjunctivitis, but he mentions, that it may, in exceptional cases, appear with the symptoms of a very acute catarrhal conjunctivitis. Both of these observers, as well as Peters and Gifford, have seen complications, especially corneal ulceration.

My own cases were, then, in so far exceptional cases, as

they all came to me with symptoms of a most acute catarrhal conjunctivitis. There was very much swelling of the conjunctiva and œdema of the lids (in two of the cases of one eye only),



but a scant yellowish discharge which lodged in the inner canthus. This discharge consisted of almost a pure culture (see Figure) of a diplo-bacillus, usually two links enclosed in an undoubted capsule, sometimes three or four.

As Morax and Axenfeld have praised especially the efficacy of zinc in this affection, although the instillations have to be used for many weeks, it may be of some importance to state, that I treated these cases daily myself with a 1 per cent. solution of protargol. Under this treatment the diplo-bacillus as well as the symptoms evoked by its presence disappeared entirely in one case in fifteen, in one in twelve, and in the third case, which is still in my hands, they are now almost gone after eight days of treatment. This is a decided improvement on the zinc treatment.

In my three cases the infection seems to have been purely one with this diplo-bacillus, while others have also seen mixed infections.

The pathogenic quality of this bacillus has been tested by Gifford on his own eyes.

SOME USES OF WATER IN OPHTHALMIC PRACTICE.¹

BY E. E. HAMILTON, M.D., WICHITA, KANS.

THE uses of water in ophthalmic practice are manifold, and its purposes varied. A short paper can not do the subject justice. To the wide-awake physician, however, only suggestions are necessary, they acting as stimuli for personal investigation within library walls.

Water is used largely as a diluent and solvent. By its use we put our remedies in perfect solution, and nicely regulate their strength for local use according to indications.

Solutions of alkaloids or their salts, such as atropia, eserine, etc., are apt to deteriorate with age. Should we desire to preserve such solutions and add an antiseptic effect, they should be dissolved with a 3 or 4 per cent. solution of boric acid. Before using they should be sterilized by boiling.

These precautions should be enforced, particularly in corneal affections. In an organ so essential to vision as the cornea, we can not afford to leave anything undone to hasten recovery.

Dr. Stroschein, of Würzburg, Germany, has devised a convenient flask for boiling ophthalmic solutions, as has also Llewellyn, of Philadelphia.

Preparatory to an operation on the eye, or its appendages, the operator's hands should be thoroughly scrubbed with soap and water and then washed with an aqueous solution of bichloride of mercury (1 to 1000). The skin in the region of the operation and the conjunctival sac should be well cleansed and scrubbed with an antiseptic wash. All instruments should be put in boiling water for five minutes, and then placed in a 2 per cent. solution of carbolic acid, pure alcohol, or sterilized water until used.

Of external applications in ocular therapeutics, none are so common as water. Its effects will vary according to temperature, duration, method, and time of application.

Modern asepsis, or antiseptis, has its basis in cleanliness.

¹ Read before the South Kansas District Medical Society.

Water subserves this important purpose by reason of its property of moisture, temperature being here of secondary importance.

In the favorable modification of inflammatory processes by aqueous application, moisture, too, supplements temperature.

With perhaps few exceptions, inflammation of the eye or its appendages, is considered a result of an invasion of pathogenic bacteria. All the symptoms accompanying such attacks, as heat, redness, swelling and pain, with possible necrosis of tissue, are presumed to be manifestations of micro-organisms, plus Nature's efforts in defense in the destruction and neutralization of these noxious agencies, and the restoration of their damaging effects on living tissues.

The degree of inflammation found in a given case largely registers the virulency of the infecting germ.

As the physiological anatomy of separate eye structures differs greatly, we naturally expect in inflammation different manifestations, according to the kind of tissues involved. Such in practice is found to be the case, and with this clinical fact comes our separate indication for the temperature of the water used locally in treatment.

If it be possible to formulate rules for its use, cold would seem to be indicated :

1. In traumatisms, to prevent or control inflammation.
2. When the inflammatory process is unattended with severe pain.
3. In inflammation of parts, which is usually attended at some stage of the process with discharge of mucus or pus, or both.

Conversely, heat is indicated in opposite conditions, viz. : In the absence of recent injury, in the absence of mucus or purulent discharge, and in the presence of pain.

I realize the impossibility of establishing hard and fast rules to which there are no exceptions, but it has seemed to me the above rules afford good working guides for our practice in the use of heat and cold.

The second and third symptoms clinicians will recognize as being attendants of conjunctival, while their absence is equally as characteristic of corneal and iritic inflammation.

In ocular injuries the early and continuous use of cold constitutes our best treatment. Often it prevents inflamma-

tion. If not, cold favorable modifies its course by preventing dilatation of the vessels, limiting exudations and destroying or retarding the growth of infecting bacteria. In traumatic inflammation cold can sometimes be applied with advantage during the entire process, even when the iris and cornea are involved.

As before intimated, uncomplicated conjunctival inflammation is not attended, as a rule, with severe pain. At some stage discharge commonly occurs, which may be free and apparent, or perhaps only sufficient to glue the lids together.

The conjunctival membrane in health is quite vascular. It and its neighboring structures are composed of loosely constructed tissue which permit of much exudation and infiltration without serious tension; hence the comparative absence of pain even in cases attended with much inflammatory swelling.

We have, of course, all grades of conjunctivitis, from the mild catarrhal form with slight discharge and little swelling, to the hard, board-like infiltration and free purulency of Neisser's gonococcus. In the latter condition cold should be applied early and persistently, particularly during the stage of exudation before the occurrence of purulent discharge. During the stage of pyorrhœa we may, as the inflammatory symptoms gradually subside, relax our cold applications, using them intermittently instead of continuously.

Aqueous solutions of boracic acid (4 per cent.), or of bichloride of mercury (1 to 10,000), should be freely used, both for their antiseptic and cleansing effect. They should be repeated with more or less frequency so long as the discharge continues. If at any time severe pain should occur, it probably would mean corneal involvement, in which case heat might do better.

In milder grades of conjunctivitis cold still remains an excellent remedy, but its use need not be so continuous or the temperature so low.

During acute attacks of granular conjunctivitis, or in the relapses of chronic trachoma, cold applications favorably modify symptoms and shorten the course of the disease.

The reaction from silver nitrate, copper sulphate, and kindred applications, is much lessened if followed, for a time, with compresses soaked in ice water.

In phlyctenular conjunctivitis or keratitis in children, cold

douchings or plungings relieve the troublesome photophobia and blepharospasm, thus enabling us to make better examinations and more effective applications.

The troublesome congestion and asthenopia following attacks of conjunctivitis is greatly relieved by cold applications of ten or fifteen minutes' duration, repeated three or four times daily. They seem to stimulate the vaso-motor nerves, and help to restore tone to the parts.

I am aware that heat and moisture constrict vessels, check exudation, and destroy germs. Theoretically, their use is indicated even in conjunctival inflammation, but in practice it is exceedingly difficult to maintain the requisite degree of heat. As ordinarily used by the laity, they amount simply to warmth and moisture, the effects of which are to relax and sodden the parts and prolong recovery, besides promoting complications.

As suggested earlier, heat seems to find its strongest indication in inflammations attended with pain and unaccompanied by discharge. These conditions prevail in keratitis, iritis and cyclitis. In keratitis we have structures involved of a non-vascular, firm and unyielding character. We have an exudation of cells from surrounding vessels, their migration to the area affected, the subsequent disposition of which may be in absorption and subsidence of inflammation by resolution, or in death, with necrosis of tissue, constituting an ulcer or abscess.

Pain is usually great, and results from pressure on the ciliary nerves, or if loss of tissue, from exposure of their sensitive terminal filaments.

In iritis and cyclitis, pain is a characteristic symptom, resulting from the pressure of exudations into the substance of the iris and ciliary body and adhesions to neighboring structures.

As pain in these cases represents tension, with pressure on nerves of sensation, heat and moisture for their soothing and relaxing effect are indicated. Experience seems to prove that their intermittent use for fifteen or twenty minutes at a time, and repeated every two to three hours, gives best results. Thus applied, moisture materially aids the effect of heat in producing tissue relaxation and absorption of exudates, thus relieving tensive pain.

In keratitis, heat and moisture subserve a further purpose,

in that they favor the development of new blood vessels for the occasion. These afford avenues of defense in Nature's battle for supremacy and channels for the transference of nutritive material in the repair of tissues.

In iritis, heat and moisture, immediately preceding the use of atropia, aid their absorption, thus indirectly helping to produce mydriasis and the breaking up of adhesions.

In glaucoma, heat and moisture, by relaxing tension, relieve pain and palliate the disease.

In orbital cellulitis, lachrymal abscess and styes, the persistent use of heat and moisture hastens resolution or promotes suppuration, thus shortening their course.

But little will be said of the methods of application. Cold is best applied with compresses taken from blocks of ice, and renewed with sufficient frequency to maintain the degree of cold required. Often they need to be changed once or twice a minute, and continued day and night. This means at least two nurses, who should be impressed with the responsibility of their position.

Heat is best applied with compresses taken from water, which may be used as hot as the finger will bear. It is surprising what a degree of heat can be borne with comfort and benefit.

In keratitis, water as hot as can be borne dropped directly on the cornea, has been recommended.

Eye cups have been devised to better maintain heat, or a tumbler may be used, and the eye opened, while immersed, to permit of direct corneal and conjunctival contact.

Poultices should have no place in ophthalmology. Their baneful effects on conjunctival and sub-conjunctival tissues should relegate them to the shades of eternal disuse.

Finally, water is plentiful and within the reach of all. Its intelligent use is of great value in ophthalmic practice.

SOCIETY PROCEEDINGS.

THIRD ANNUAL MEETING OF THE WESTERN OPHTHALMOLOGICAL, OTOLOGICAL, LARYN- GOLOGICAL AND RHINOLOGICAL ASSOCIATION.

Discussion on paper read by DR. ADOLF ALT, of St. Louis, entitled "*Recent Researches Into the Histo-Pathology of Trachoma*," (illustrated), which appeared in the April number of this journal.

DR. H. GIFFORD (Omaha).—Like many others, I have the idea that trachoma must be caused by some animal microbe, since the best bacteriologists who had investigated the disease have found no bacteria. So I started a search for a trachoma plasmodium, and for some time thought I had found it, but afterwards found that the same microscopical pictures could be obtained from other forms of conjunctivitis. I have not gone deeply into the mystery of trachoma and can add nothing to Dr. Alt's admirable description. That the same structural conditions should be found in trachoma and follicular conjunctivitis is not surprising. In other parts of the body the irritation produced by the most varying sorts of bacteria results in practically identical histological changes.

DR. B. E. FRYER (Kansas City, Mo.)—I wish to congratulate Dr. Alt on his paper, and to thank him for the instruction he has given me in this matter. I know the thoroughness with which he conducts his researches. The position he takes in regard to these bodies found in cases of trachoma seems to me to be very reasonable and they may be the origin of the trouble.

DR. A. ALT (St. Louis).—There is very little more for me to say on this subject. Of course it is utterly impossible for me to prove that what I have described is really the particular parasite which causes trachoma. I only judge from the regu-

larity and the often enormous frequency with which these bodies are found that they may be of more importance than has been known. When I show you to-morrow the specimens you will be astonished at the frequency with which these peculiar bodies occur in some cases of trachoma, more particularly in recent ones. I have specimens of one case in which under a low power the whole field is studded with these peculiar large cells and their derivates.

I do not see how anybody of large experience can doubt the infectiousness of trachoma, although I know there is at least one practitioner present who denies it. I once had occasion to publish an epidemic of trachoma occurring in an orphan asylum in St. Louis in which all but three children out of sixty-five were infected with the disease from one newly entered child. At the Heidelberg Ophthalmological Congress last year, Axenfeld proved that so-called non-infectious follicular conjunctivitis is, after all, also an infectious disease, by having infected himself. The inoculation of rabbits with trachoma does not help us materially, because while we may produce the disease in these animals, it does not last. This brings me to the consideration of another point. You will remember that Burnett and a number of other gentlemen have called attention to the fact that the negroes are almost immune to trachoma. I think I have found a cause for this immunity. The negro seems to have a much greater supply of lachrymal glandular tissue than the white races. Since we know that the secretions of the body are anti-parasitic, this greater secretion of tears may well explain why the negro is so much safer from infection with the particular parasite that causes trachoma than we are.

Discussion on paper read by DR. B. E. FRYER, of Kansas City, Mo., entitled "*The Antiseptic Preparation of the Conjunctiva for Cutting Operations on the Eyeball,*" which appeared in the April number of this journal.

DR. C. D. WESCOTT (Chicago).—I have nothing to criticise in the paper just read. Of course each one of us believes that his own method is best. I simply want to say that I secure ideal healing, after cataract and other operations upon the eye, without the use of any germicide whatever, although I have no

doubt all of you have had equal success. My operations are almost all done in a private operating room where nobody else operates, and where I have absolute control of everything. Many of my patients who present themselves for cataract and other similar operations come in from the country, wishing to go home as soon as possible. I frequently operate on the following day after first seeing the patient. The patient takes a general bath and the head is thoroughly scrubbed the night before the operation. Then, half an hour before operation, the face is scrubbed with soap and water, and just before making the operation I use either cocaine or holocaine. I, personally, scrub the lids, the brows and lashes with a warm solution of boric acid. My nurse has previously done the same thing with soap and water. Then I flush the conjunctival sac several times with a warm solution of boric acid. I use Dr. Grüning's fountain vessel from which we can pour a small stream. I do not believe that boric acid is anything more than an inhibitory antiseptic, if it is that. The eye is dressed after the cataract operation every two days only, and on the sixth or eighth day the bandage is discarded. I frequently see cases which show no congestion, and very often the lids are not gummed together, if I make my dressing every two days. Where, before operation, there has been a slight congestion of the conjunctival sac, I am in favor of applying a dressing each day, and using a little sterilized vaseline to prevent gumming of the lids. As a dressing I use two or three layers of borated gauze applied against the lids, and over that borated cotton and a mosquito-bar bandage. I have been dressing eyes in this way for the past five or six years, and have no cause to regret it. I have at times, however, regretted the use of bichloride solutions even in the strength of 1 to 6,000 because I have irritated the conjunctiva by it.

DR. KNAPP (New York).—The Doctor speaks in general terms that he is satisfied with his results. He gives us no statistics. It would be interesting to know how many cases of suppuration he has had, if any, and under what conditions.

DR. W. L. DAYTON (Lincoln, Neb.).—The question asked by Dr. Knapp is very pertinent, and reminds me that the only case of cutting operation on the eyeball followed by suppuration which I remember of having had, was one in which I used a 1 to 10,000 bichloride solution. Like Dr. Wescott, I rely

almost solely upon the warm boric acid solution, and I can not recall now a case in which I ever have had suppuration of the eyeball. This may seem to you a little egotistical, but I do not remember of having had a single case of suppuration or panophthalmitis following a cutting operation under my rigid asepsis. I follow the usual procedure in these cases of cleansing the face, brows and eyelashes thoroughly before irrigating the conjunctival sac. In cases of conjunctivitis, or of any trouble with the sac, I use a bichloride solution, but in office work and in the hospital I rely entirely upon boric acid. I have tried formalin somewhat, but have not been pleased with its action. In all cutting operations upon the eye I use a bandage in the place of isinglass or plaster strips, or anything of that kind. I have not progressed sufficiently to dispense with bandages. Whether boric acid solution is a bactericide is a question. So long as results are good, I do not care to find any better solution for preparation in eye operations.

DR. A. ALT (St. Louis).—While I agree with what Dr. Fryer has stated in his paper, and while I always use a bichloride solution, I do no longer use it 1 in 5,000-6,000, but 1 in 10,000, and I am perfectly satisfied with that. I have had two cases in old people in which suppuration followed cataract extraction after I had used bichloride solution of 1 in 5,000. Both of these cases occurred in hospital practice and I had thought everything was extremely favorable. One of them was an old physician, for whom I did everything I could possibly think of. My instruments and bandages were thoroughly sterilized. Myself, the nurse, the bed and the room were all thoroughly sterilized, and yet suppuration took place. I then became convinced, that on account of the extreme age of the patient, the caustic effect of the bichloride in this strength was probably too much and caused necrosis of the tissue. However, we know, that in spite of all our antiseptics or chemical agents,—in spite of washing our instruments and rendering them thoroughly sterile, suppuration sometimes takes place; that germs remain in the conjunctival sac, and that we can not guard against infection from the nasal passages.

I would like to know whether any of the gentlemen are acquainted with, or have tried to leave the eye absolutely unbandaged after cataract extraction. Two papers have been published recently on this method. One by Hjort, a Scandina-

vian oculist, in which a series of some fifty cases are reported. He stated that healing was natural and as kindly as possible. Suppuration never followed, but he had in one or two instances prolapse of the iris. The other practitioner is an oculist in Darmstadt, Germany, who published a series of sixty cases in which he had the same results. He, however, places a wire gauze mask over the eyes. He reasons, that the natural flow of normal tears has an excellent bactericidal effect, and that by not interfering with this natural secretion this action remains unimpaired and prevents infection.

DR. J. M. BALL (St. Louis).—I believe one source of infection in cataract operations is the condition of the sweat glands. I am led to this view by an unfortunate case that I had last summer where, after taking all the usual precautions, the wound became infected. For several days following the operation the weather was extremely warm and the patient was perspiring freely. I would like to ask some of the older members of the Association if they make it a practice to operate on cataracts in hot weather. In this case, I spoke of, the usual precautions were taken. Everything was boiled, the patient thoroughly scrubbed, and the conjunctiva washed with a 1 to 4,000 bichloride solution. There was no nasal trouble and no trouble with the lachrymal apparatus, and I do not know the source of infection unless it came from the sweat glands. Whenever patients will submit to it, I have the eyebrows shaved in order that the parts may be thoroughly scrubbed. You can not remove the cilia, but I believe that sometimes it would be a good thing if we could do so. Certainly, in many instances, it is a difficult matter to clean the eyebrows thoroughly unless we shave them.

DR. ALT.—I will say in answer to Dr. Ball's question that the oculist in Darmstadt referred to pulls out all the eyelashes previous to operating for cataract.

DR. A. E. PRINCE (Springfield, Ill.)—A thought occurred to my mind a short time ago, and I will express it in the hope that Dr. Knapp may give us his opinion with regard to it. All that has been said and written with regard to the preparation of the eye preliminary to cataract extractions or operations on the eyeball has reference to rendering the conjunctival sac antiseptic. A case occurred in my practice recently which led me, more than any other one thing I can think of now, to the

opinion, that we ought to devote ourselves to another kind of preparation of the conjunctiva, and that is, the preparation of the intra-vascular circulation of the conjunctiva and the preparation of the nutrition of the patient. We should examine these patients with reference to the condition of the blood. The case I have reference to is this. I made an operation for entropion, and following it there was considerable swelling about the tissues of the lids. I thought the swelling would go down and healing would take place in a short time. I gave the matter less attention than I should have done, and three days after my operation a corneal ulcer developed. It was an old case of trachoma. It was entirely healed, and the cornea had been normal. This ulcer was serpiginous in character, and finally the center of the cornea became smoky. I expected to lose the eye. As a matter of desperation I gave the lady three grains of quinine and ten drops of tincture of iron every three hours. I gave her also one sixtieth grain of strychnia to increase the action of the heart. Upon investigating the previous history of the case I found that she had had boils, having had seven on one arm. At the time I operated she seemed to be a well woman, and I had operated without asking any questions. Fortunately the treatment—I do not know which to attribute it to—improved the condition. The wound in the skin of the lid had shown no tendency whatever to heal. After fortifying her system with the internal medicaments the wound assumed a healthy condition, nutrition was established, the wound healed, and the cornea was saved.

This may seem a digression from the subject under discussion, but I want to bring up the point, that we should look to the condition of nutrition of the individual upon whom we operate. Whether we use bichloride of mercury or a warm boric acid solution, or the biniodide of mercury, if the intra-vascular circulation of the conjunctiva is not in good condition the cornea may slough. If the micro-organisms enter the wound and the condition of the blood is such that it is not phagocytic, the cornea will slough and we will have trouble. I think we should look after the nutrition of the patient and make it as important a part of the preparation as irrigating and dropping in solutions and antiseptics for several days in advance of the operation.

DR. L. R. CULBERTSON (Zanesville, Ohio)—I have not

used bichloride of mercury except for sub-conjunctival injections. I always use a formaldehyd solution in the strength of 1 in 3,000-6,000, and thoroughly irrigate the lids, eyelashes and eyebrows. Before operating I inquire as to whether there is a rheumatic or gouty tendency, or whether there is any tendency to diabetes, and if there be such a tendency I regulate the diet accordingly. If there is a rheumatic or gouty tendency I give my patients the salicylate of strontium, which is one of the most valuable salicylate, and in this way, as far as possible, I avoid trouble from uric acid and its effects. Shutting off all starchy food and sugar will lessen the danger of inflammation when there is a diabetic tendency.

A MEMBER.—Dr. Prince struck a sympathetic cord in me. Instead of putting bichloride of mercury into the conjunctival sac I have found it excellent practice to have the patient take it internally. During the last four or five years I have used no solutions of any kind within the conjunctival sac if it be healthy, and also if there be no disease of the lachrymal apparatus, or nasal trouble. I have paid a good deal of attention to the preparation of the patient, and have followed out the suggestion given in a little manual by Gould and Pyle, of administering a mixture of bichloride of mercury and iodide of potassium, syrup of sarsaparilla and water, so that the patient gets in the neighborhood of one twenty-fourth of a grain of bichloride of mercury for two days prior to the operation, leaving the eye and conjunctival sac entirely alone. It has occurred to me from personal experience that we are liable to, and oftentimes do, irritate the conjunctival sac in our attempts to render it aseptic. This irritation no doubt has been the starting point of infection in many cases, which, after the operation, has ruined all the work that we have attempted to do for the patient. If, by proper preparation of the patient prior to operation, we can avoid the use of antiseptics in the eye, we have at least gained one good point, that is, we have certainly not added any additional irritation to the eye in our attempts to render the conjunctival sac aseptic.

DR. A. C. CORR (Carlinville, Ill.).—The remarks of the last speaker are interesting, but I do not think he sufficiently emphasized the points that were brought out. Reference has been made to the nasal apparatus—to see that it is all right. Now, it takes a great deal of insight and close examination to

see whether this is all right or not, and even though you may spray out the nasal cavity and wash out the conjunctival sac, there are germs enough left to infect the eye in a day or two, or soon after the operation. I simply rise to emphasize the particular point, that if you could slit up the canaliculus and nasal duct into the nose and plug it up from below, and keep it so until the corneal surface is healed, it would be an admirable plan.

I believe the point mentioned by Dr. Prince is one of great importance, namely, that we have lost sight, in our ardent zeal after mere antiseptic preparations, of the importance of paying particular attention to the nutrition of our patients in connection with operations upon the eye. Patients with an impoverished condition of the blood do not recuperate very rapidly after surgical operations upon the eye, and consequently it is important for us to bear in mind the nutrition of the patient.

DR. FRANCES DICKINSON (Chicago). — I am very much pleased with Dr. Prince's constitutional treatment in these cases. I think boric acid and the bichloride of mercury treatment have their places, but I doubt if it is wise for us to use any one of them exclusively in all cases. Before operating on the eye it is always wise to examine the patient's urine. When the processes of elimination are not carried on properly the quality of the blood is injurious to the eye and retards repair. Recently a case came to me in which there had been acute blenorrhœa of ten days' duration. The patient was 35 years of age, and the entire cornea was in a sloughing condition. Patient had applied poultices before seeing any physician. The bulbar conjunctiva was badly swollen and pus secretion abundant. I asked no questions as to its origin, but simply examined the pus. Gonococci were abundant. At the end of ten days no more gonococci were to be found in the eye, but simply streptococci. Before I saw the case bichloride of mercury solutions were used as well as nitrate of silver. After the gonococci had disappeared I used no more nitrate of silver. In spite of loss of the entire cornea, the uncovering of the iris and the softening of the eyeball, the ball is now becoming hard and a new structure is forming entirely over the iris. Before this new tissue from the sclero-corneal margin reached the pupil the patient could count my fingers at one foot and the lens was not opaque. The new growth covers the pupil

and is becoming white and opaque. I simply used boric acid solutions for cleansing the conjunctival sac and at no time used any pressure bandage whatever, but kept a light, wet and warm absorbent cotton pad constantly on the eye. The eye-ball is saved.

DR. H. KNAPP (New York).—It is with some reluctance that I comply with your wishes to say a few words on this subject. The majority of cases of cataract I have lost were lost by bad operations, the fault being on my part, and no one here has touched upon this point. I have lost more cases from one fault than all the rest, and that is insufficient section. I have produced septic conditions by so doing. Every oculist who has operated a great deal for cataract must necessarily be of the same opinion. I see about one-half of one per cent. of suppuration in my cases. Last winter I had one hundred and eleven extractions from October till now, and there was one case of suppuration, the eye was lost. It was a case of suppuration of the iris. I have abandoned almost all antiseptics, and I simply endeavor to keep the eyes of my patients thoroughly clean. If a patient has conjunctivitis, or anything of the kind, I refuse to operate on him until this condition is cured. I do not bandage the eye, as I am inclined to think that it brings about congestion. In these cases we can not sterilize the conjunctiva completely, but nevertheless we will get good results in most of the cases from operative interference. A healthy man stands a much better chance for a prompt recovery than one whose nutrition or vitality is lowered. The case I lost this winter was a gentleman, 91 years of age. I operated upon him, as far as I could see, without any fault whatever in technique. After the section the eye was completely collapsed, like a wet cloth. The lens came out completely, yet there was an angular folding of the whole eye. The next day I found he had some irritation and two days later an inflammatory condition which I thought would be a purulent iritis. The iris was greatly swollen and the pupil was filled with yellowish material. I at once opened the wound and let out what matter there was in the anterior chamber. I did this daily, and in this way the eye got well. He left three weeks after the operation, there being not a particle of sloughing of the cornea, but there were evidently deeper changes and the perception of light was poor. If I should get, in the

future, a case of the same kind in an extremely old patient, who showed no power of resistance, I would inject physiological warm salt solution so as to restore the parts to their natural position. The cases in which suppuration took place were those in which I made an insufficient section. I consider a clean operation, where the wound and everything is in the best condition, more important than the use of antiseptics.

DR. ALBERT HALE (Chicago).—We seem to follow in the line of the obstetricians in our attempt to disinfect the mucous membrane around the eye, and we can not do it any more than the obstetrician can disinfect the passages for the birth of the child. In my obstetrical studies in Prague we were taught that it was a difficult matter to render the vagina aseptic, and students who are now coming back from there say that no effort is made in normal cases to disinfect the vagina. It is left to Nature and the normal secretions, and why should we not leave the conjunctiva alone? Of course, my remarks do not apply to cases of conjunctivitis or any condition similar to it, but I mean a healthy eye that comes to us for operation. The result of an operation will be better if the eye is not previously irritated by agents with which to obtain asepsis. If we take a lesson from obstetricians in this particular it will be valuable to us.

DR. FRYER (Kansas City, Mo.).—I believe there are many cases in which the wounds heal after cutting operations without any germicides. I believe it is so in the majority of cases. But the loss of a single eye is a serious matter. We can not tell in any case whether an eye is infected or not without making a microscopical examination of the secretions, or putting on a dressing and watching it. I have been misunderstood in regard to the dressing after operations. I generally allow the patient to go forty-eight hours after the first dressing. This can be done if the operator is careful in his antiseptic work.

In regard to solutions there is a great deal of carelessness on the part of druggists in making these preparations. You may order 1 to 5,000 or 1 to 10,000 and they make it double the strength. These solutions must be correctly made. I recall a case that I had within a month. My operation was clean and the man had been prepared two weeks before operation, but at the end of the fifth or sixth day the bandage was taken off and he rubbed and scratched his eye. I charged him with

doing something of the kind, but he denied it. I examined the eye carefully and found that the wound was partly open. The eye was infected and I found in the anterior chamber a small quantity of pus. I applied an antiseptic dressing, shortly after which the pus disappeared. I have rarely seen any of these cases of pus in the anterior chamber without serious results following them.

Dr. Dayton and others spoke of boric acid. Careful experiments by bacteriologists show that boric acid is inert as a germicide. You will remember that I alluded to cases in my paper with prostatic trouble. In old men with prostatic trouble, upon whom we operate, we should examine the urine for albumen and sugar in every case. We should know whether the patient has diabetes or renal trouble. We ought to know this before we operate, particularly as the general condition of the patient has an important bearing on our operative procedures.

Dr. Ball spoke of the sweat glands as being a source of infection of interfering with healing of the wound. We should look out for that.

Dr. Prince speaks of the importance of looking to the general nutrition of the patient and the condition of his system. I agree with him, and I believe every careful oculist does that. I would not have operated on Dr. Prince's case at all, nor would he have done so if he had known the patient had had boils. Boils are indicative of a depressed condition which we must correct before we operate upon the eye.

Dr. Knapp has alluded to insufficient section in these cases. I think probably I have seen as many of Dr. Knapp's operations as any one present, and I should say that they are simply perfection, and that his technique could not be in any way responsible for the failures he mentioned.

Discussion on paper read by DR. C. BARCK, of St. Louis, entitled "*Extraction of Immature Senile Cataract*," which appeared in the May number of this journal.

DR. A. ALT (St. Louis).—I perfectly agree with the Doctor in regard to the possibility, and sometimes even the moral demand of extracting immature cataracts. I have done so in a large number of cases and never have had to regret it.

The Doctor, in his paper, I believe stated that Hirschberg was the first to recommend the extraction of immature cataract. As far as I remember it was Schweigger who emphatically stated, that after the age of 55 or 60 years immature cataracts may be safely removed. We must not extract immature cataracts in subjects too young. Immature cataracts have undoubtedly been always extracted, although not systematically. Dr. Knapp told the story long ago of a British surgeon who extracted immature cataracts, and when asked, why he did it, replied: "If I do not operate on them, they will go to somebody else." This is, of course, not the proper standpoint from which to look at the matter, but it doubtless has always had some influence with certain operators.

I am fully in accord with the Doctor, that in people of from 55 to 60 years of age immature cataracts can be extracted smoothly and as perfectly as mature ones, often without leaving any cortical substance behind. In some cases, I think, we may even expect better results from the extraction of an immature cataract than if we wait longer. The patient being younger when we operate, is healthier and more active, and his recuperative powers are consequently greater. It is particularly in patients who have to earn a living for themselves and their families that I operate as soon as the dimness of the lenses is sufficiently advanced to take away the chance of earning the necessities of life. To keep such patients waiting until the cataract is ripe is, it seems to me, downright cruelty.

DR. DUDLEY S. REYNOLDS (Louisville).—The subject of extraction of immature cataract is one of great importance. I have a professional brother who has had a zonular cataract for many years in the left eye. The entire posterior surface of the lens has been opaque for more than a year, while in the anterior portion of the lens there is a little opaque matter limited to the anterior cortex. In the nuclear part of the lens is a mass resembling a snowball in whiteness surrounded by normal transparent lenticular substance. The question arises, shall this lens be extracted? As you know, in many cases of lamellar cataract the capsule participates. We may have capsular opacities before the lens is involved. I think that as long as a person has the capacity to read with the fellow eye, it should be let alone. The moment he is not able to read with the other eye, then I should resort to extraction, with the under-

standing that almost certainly a subsequent needling operation of the opaque capsule might have to be made. But I should not care to extract such a lens through a normal pupil; I should prefer to supplement it by an iridectomy. In the extraction of immature cataracts, whether zonular or nuclear, the operation should not be done through a normal pupil, because it is certain that a large amount of cortical substance will be retained in the capsule. No harm will, however, result if the amount is not large, and if the eye is protected by an iridectomy. I am sure that if this be not done there will be some harm done to the ciliary region, and this may bring on an attack of glaucoma, and a glaucomatous attack after the extraction of an immature cataract is a dangerous complication. It will not occur if the extraction is preceded by an iridectomy.

DR. C. BARCK (St. Louis).—I have little to add. As to the remark made by Dr. Alt, I am not aware Dr. Schweigger ever took the position that Hirschberg did in the extraction of immature cataract. As to iridectomy, I have stated that in all of my cases an iridectomy has been performed, and that I have never gone so far as to remove an immature cataract without an iridectomy.

Discussion on paper read by DR. A. E. PRINCE, of Springfield, Ill., on "*Excision of the Tarsus for Extreme Non-Cicatricial Ectropion of the Lower Lid,*" which appeared in the May number of this journal.

DR. E. A. KEGLEY (Cedar Rapids, Iowa)—I would like to ask Dr. Prince if, when making excision of the tarsus, he at the same time opens the tear duct.

DR. A. E. PRINCE (Springfield, Ill.).—Yes, sir.

DR. J. P. WORRELL (Terre Haute, Ind.).—The Doctor's paper calls to my mind a case upon which I operated some two years ago. The patient applied to me for cataract operation. There was extreme ectropion, the result of a neglected purulent ophthalmia. My operation differed from the Doctor's in that I did not sacrifice the tarsus. I made an incision parallel to and at perhaps 5 millimeters from the margin of the lid, and followed it by another line parallel to it, and these two incisions were united at the inner and outer canthus. In this way I removed a wedge-shaped mass, and even without put-

ting in any stitches, I held the lid in place and had an admirable result. Opening of the canaliculus was made preliminary to the operation.

DR. PRINCE.—I hope the members will think sufficiently well of this operation to give it a trial. I attribute the good results to the cicatrization. The tarsus, when it becomes misshaped and hypertrophied, crowds the lid outwards, and if we remove a portion of it sufficient to have cicatrization lengthwise parallel with the margin of the lid, we are bound to have a good result.

MISCELLANY.

INSUFFICIENCY OF THE OCULAR MUSCLES.

In a paper on "Operation for Insufficiency of the Ocular Muscles," A. Duane (*N. Y. Med. Jour.*) formulates the following conclusions as to what conditions they may relieve:

1. An obvious disfiguring deflection of the eyes and the often annoying diplopia that such a deflection may give rise to. The term diplopia, I may add, includes not only the pronounced form in which the objects appear frankly double, but also the slight intermittent form in which the double images are not distinctly separated, but overlap, and at times are fully united, at times spread apart again. This latter variety of diplopia produces great confusion of sight, particularly in reading, when the slight overlapping of the letters causes the print to look blurred, as though the types had slipped.
2. Pain in using the eyes and asthenopia; a sense of weariness and strain preventing the patient from using his eyes for very long at a time.
3. Headache, migraine, and other reflex pains (not infrequently referred to the occiput or spine).
4. A sense of constant confusion in the head and of dullness, causing aprosexia and mental hebetude and depression.
5. Vertigo.
6. Digestive disturbance, with impairment of appetite and nutrition and subnormal body weight.
7. Chorea (rarely).

PAMPHLETS RECEIVED.

- "Iodoformogen," by E. Kromayer, M.D.
- "Diet for Consumptives," by R. W. Wilcox, M.D.
- "Dermoid Cyst of the Orbit," by H. Moulton, M.D.
- "Primary Syphilis of the Tonsil," by M. Thorner, M.D.
- "Primary Tuberculosis of the Rectum," by Dr. L. Straus.
- "The Surgery of the Gall-Bladder and Its Ducts," by H. O. Walker, M.D.
- "Some Fads and Fallacies of Modern Rectal Surgery," by L. Straus, M.D.
- "Thiosinamine—A Clinical Contribution to Its Study," by G. F. Suker, M.D.
- "Vicious Reading Distance a Cause of Asthenopia," by Ch. H. Thomas, M.D.
- "Some Personal Observations in Abdominal Surgery," by H. Tuholske, M.D.
- "The Histology of the Glands of the Stomach," etc., by J. C. Hemmetter, M.D.
- "Serious Complications of Suppuration of the Middle Ear," by M. Thorner, M.D.
- "Some Experiments on the Assimilation of Diphtheria Antitoxin," by C. Fisch, M.D.
- "Twenty-Eighth Annual Report of the St. Louis Insane Asylum," by E. C. Runge, M.D.
- "Uncommon Accidents Following Operations in the Nose and Throat," by M. Thorner, M.D.
- "The Use of Pilocarpine in Some Acute Infectious Diseases," by E. W. Saunders, M.D., J. Zahorsky, M.D., and C. Fisch, M.D.
- "The Report of an Unusual Contraction of the Visual Fields and Disturbance of the Color-Sense Following an Injury," by T. F. C. Van Allen, M.D.

THE AMERICAN JOURNAL OF
OPHTHALMOLOGY.

VOL. XV.

JULY, 1898.

NO. 7.

ORIGINAL ARTICLES.

FIVE CASES OF PARINAUD'S CONJUNCTIVITIS.¹

BY HAROLD GIFFORD, M.D., OMAHA, NEB.

IN FEBRUARY, 1889, Parinaud reported to the Ophthalmological Society in Paris, three cases of an affection which he called infectious conjunctivitis of animal origin. Since then, six other cases have been reported in France,² while in Austria, Goldzieher³ has described the same affection, evidently without knowledge of Parinaud's communication, as lymphoma of the conjunctiva. Aside from this, if we except a questionable case described by Greeff,⁴ in Berlin, as pseudo-trachoma, the disease has not, so far as I know, been reported elsewhere. The main characteristics of this conjunctivitis, as described by the French, are a rather sudden onset with great

¹Read before the Third Annual Meeting of the Western Ophthalmological and Oto-Laryngological Association, held at Chicago, Ill., April 7-8, 1898.

²The original communication of Parinaud is hard to get; I know it mainly from Despagnet's article (*Revue d'Ophthalmologie*, November, 1896, p. 665) and from the thesis of Dominique (*Thèse de Paris*, 1897) in which all the other French cases referred to in this paper are collected.

³*Centralblatt f. Augenheilk.*, 1893, p. 112.

⁴*Archiv. f. Augenheilk.*, xxiv, p. 60.

thickening of the lids; muco-purulent discharge, sometimes profuse at first but rapidly becoming rather scanty; the formation within a week or two of large frequently polypoid and pedunculated granulations, on the tarsi, on the folds, or on both, and sometimes on the ocular conjunctiva. Between these larger granulations which are at first red or greyish-red and somewhat translucent there sometimes occur numerous smaller yellowish ones. Between or on the large granulations there sometimes occur erosions or small ulcerations. Almost immediately after, or very rarely before, the development of the conjunctivitis, there occurs sudden inflammation of one or more of the groups of lymph-glands on the same side; the preauriculæ and retro-maxillary groups being most frequently involved, though sometimes both these and the cervical and sub-maxillary glands are affected. This affection of the lymphatics is generally very marked, the swelling being sometimes enormous and suppuration occurring frequently. With the onset of the disease, slight rigors and fever with general depression sometimes occur. If we except the single atypical and somewhat doubtful case of Rohrner, the affection is always one-sided, showing no tendency to spread to the second eye, nor to any other individuals with whom the infected person may come in contact. Left to itself it generally undergoes a spontaneous cure in from two to six months, though it is sometimes very obstinate about responding to various forms of treatment. Parinaud considered the infection to be of animal origin partly on account of its isolated and unusual character; and partly because one of his patients was the wife of a butcher, while another lived in a house in another part of which meat was stored; and most other French authors who have reported cases have fallen in with this idea upon similarly scanty premises.

My own cases are as follows:

CASE I.—F. C., aged 43 years, an American commercial traveler, came to me October 21, 1890, saying that about three weeks before, while riding on a freight train, he got dust or a cinder into the right eye, and within two or three days the lids of the eye began to swell and the eye to discharge. Soon after, the glands of the neck became swollen. Stat. præ.: R. E., upper lid œdematous and drooping, showing only one-half the cornea. Conjunctival surface, both of the tarsi and retro-tarsal folds covered with large rounded granules with several patches

of superficial ulceration. Cornea clear, discharge only moderate, irritation and discomfort insignificant; pre-auricular and retro-maxillary glands on the right side are merged in a large swelling which makes that side of the face look as if the patient had a pronounced case of mumps; the eyes and lymphatics of the left side entirely normal. Though this case presented some resemblance to the most marked cases of acute trachoma, the size of the granulations, some of which, especially on the folds, were almost pedunculated; the occurrence of the areas of ulceration between them, the marked involvement of the lymphatics, combined with the rather scanty discharge and the remarkable freedom from subjective symptoms made me sure that it was a different disease. The treatment consisted in frequent irrigations of boracic acid solution, hot applications and, later, sulphate of copper and 2 per cent. nitrate of silver applied to the everted lids. The changes which occurred under the use of these caustics were far more gradual than is usual with acute trachoma and at the end of the three weeks during which the man was under my care the granulations were about as prominent as ever, but the discharge and the swelling of the lids had decreased perceptibly. I do not know what treatment was pursued after he left Omaha, but he gradually got entirely well in the course of the next few months; the swelling of the lymphatics also disappeared without the occurrence of suppuration. When I saw him again in 1897 the conjunctiva was entirely smooth but had a slight atrophic look similar to that left in some cases of trachoma, and the upper lid drooped slightly.

CASE 2.—Mabel H., aged 7 years, a healthy American girl, began to have some trouble with L. E. six months ago, but for the last two weeks has been much worse. Stat. præ.: R. E. normal, except for moderate congestion of conjunctival folds; L. E., retro-tarsal folds above and below thickly studded with polypoid granulations averaging one-eighth of an inch in diameter; most of them somewhat pedunculated. The surface of the granules is rough and covered with a tenacious but rather scanty discharge; aside from this, no ulcerations of the conjunctiva; one large granulation on the lower tarsus, otherwise tarsal conjunctiva normal; cornea normal; deeply seated in the upper tarsus is a swelling the size of a small pea which, on being incised, emits a thin yellowish pus. The glands of the

parotid region and along the posterior border of the sternomastoid muscle markedly swollen on the left side; on the right side there is a very slight swelling of the cervical glands only. Under chloroform the granulations were trimmed off and after a week or ten days the child went home practically well. The glands did not suppurate.

CASE 3.—October 12, 1896. M. L., aged 38 years, an American farmer, says that about two weeks ago, left upper lid began to feel sore, and within twenty-four hours thereafter the glands of the face and neck were swollen and the eye was discharging freely. The discharge increased for some days and then decreased. Stat. præ.: R. E. normal; L. E. conjunctiva of the ball, of the lower tarsus and fold, and of nearly all the upper tarsus normal; upper retro-tarsal fold much swollen and coarsely rough with three large fungiform granulations, one just outside the center, one-eighth of an inch in diameter; another at the junction of the tarsus and the fold near the inner angle; and a third, about one-half as large, on the tarsus close to the inner angle. In the center of the fold is an elevated ulcerated area about one-fourth of an inch in diameter with much thickened borders of granulation tissue. The surface of the ulcer is uneven and grey, the grey substance not being easily removed by the sharp spoon; cornea clear and sight normal; secretion very moderate; subjective symptoms almost wanting; pre-auricular and retro-maxillary glands, on the left side only, much swollen and tender; but the patient assures me they are not nearly so large nor so tender as a week ago. The granulations and edges of the ulcer were trimmed off and the ulcer cauterized with solid nitrate of silver. He went home the same day with a boracic acid collyrium and directions to have 2 per cent. nitrate of silver applied daily. When seen again, October 22, the eye appeared nearly well, the ulcer was gone, and there was very little swelling. The swelling of the glands subsided without suppuration.

CASE 4.—August 29, 1893. Romeo L., aged 9 years, of Scandinavian parents; about a week ago R. E. got sore. Stat. præ.: R. E. normal; L. E. both retro-tarsal folds and much of the upper half of the bulbar-conjunctiva studded with numerous little pustular-looking nodules. Many of these appear to have broken down leaving shallow ulcers 2 to 5 mm. across. Toward the outer angle in the lower cul-de-sac several large

fungiform granulations. Some of these look yellowish in the center but emit no fluid upon opening; discharge and irritation very slight; cornea clear; no decided swelling of pre-auricular glands, but a row of glands behinds the sterno-mastoid muscle, on the left side only, very decidedly enlarged. Boracic acid and calomel were tried for several days without much effect. Then yellow ointment was tried, but the child disappeared before any great change had occurred.

CASE 5.—November 2, 1887. John K., aged 25 years, Bohemian, machinist. Two weeks ago R. E. began to discharge and lids became swollen. Kept getting worse for three days, at the end of which time the swelling was extreme. Then the symptoms declined to some extent. Soon after the eye trouble began, the glands of the face and neck swelled. Stat. præ.: L. E. normal; R. E. moderate muco-purulent discharge; both retro-tarsal folds swollen, granular and studded with small superficial ulcers covered with greyish secretion; two of these ulcers are on the upper tarsus and a few on the bulbar conjunctiva, one of them about one-eighth of an inch in diameter only one-eighth of an inch above the cornea; cornea normal; irritation slight; pre-auricular glands and those behind and below the jaw, on the right side only, immensely swollen and somewhat tender, but not so much now, according to the patient's statement, as some days ago. A collyrium of sublimate 1-5000 and hot applications were ordered and the patient went home to a neighboring town. He was not seen again, but I heard indirectly that his eye got entirely well in the course of a few weeks. I am not sure whether the glands suppurred or not, but I think not.

The last two cases are somewhat atypical, Case 5 on account of the absence of the large characteristic granulations and the number and extent of the conjunctival ulcers; Case 4 in the comparatively slight involvement of the lymph glands; but I feel sure that they belong in the same category with the others and I consider them of decided importance as giving the clew to what I believe to be the true nature of the disease. It seems to me probable, that the infection starts with the formation of a greater or less number of small abscesses in or below the conjunctiva. In this stage the patient is seldom or perhaps has never yet been seen. When these abscesses break, the discharge becomes profuse for a short time, and in most

cases large granulations develop from the edges of some of the ulcerations or the small fistules left by the abscesses. But where, as in Case 5, these granulations fail to develop to any great extent the ulcerations may remain as the most prominent features. It may be that in the cases like Case 1, where the whole tarsal surfaces are covered with granulations, some of these have a different origin, but that this is the explanation of the occurrence of the large fungiform and polypoid forms, I firmly believe. Despagnet has also pointed out that the small yellowish granulations, observed in his case, were really abscesses, but it does not seem to have occurred to any one that the larger granulations may have had a similar origin. From a clinical standpoint, all the cases hitherto reported may roughly be divided into two classes, those like Case 1, in which the whole tarsi are studded with granules and which have a certain resemblance to very pronounced cases of acute trachoma; and the more numerous ones in which the polypoid character of the granulations is more pronounced, the folds being chiefly involved, the tarsal surfaces remaining comparatively or quite normal, any granulations which occur upon them being surrounded by perfectly normal membrane. Where, in one of the cases, such an ulcer as that in Case 3 occurs, the question of tubercular conjunctivitis might easily be raised. I have never seen but one case of the latter affection and I must say that the ulcers and the granulations both presented a decided resemblance to those of Mr. L. The main points of difference were in the history, in the much more decided redness of the otherwise normal conjunctiva, in the tuberculous case; and in the comparatively slight involvement of the lymphatics; the swelling of which in the tuberculous cases never attains to anything like the size generally observed in the disease considered in this paper.

With regard to the question of the animal origin of the disease, it may be that Parinaud's view is correct, but his grounds for this seem to me entirely insufficient. Of the nine cases hitherto reported in France, only one occurred in the family of a butcher, two lived in the same building with butcher shops (one of these had been amusing himself by burying dead birds), one lived in the same building with a leather dresser, one lived on the same street with a butcher shop, two lived upon farms and more or less to do with the care of animals,

while in the other two there was no question of connection with butcher shops or domestic animals. This is the sum of the evidence in favor of the animal origin of the disease. Goldzieher says nothing of a supposed animal origin. Of my own patients I have no notes on this point with regard to the children, but in none of the others was there any evidence in favor of an animal origin. One of the men was a farmer but had abundant help and never took care of his own stock. The disease is evidently infectious; apparently non-contagious; and its rarity, as Parinaud urges, speaks in favor of an unusual origin. Bacteriological investigations as to its origin have not been fruitful; a very careful investigation of one case by Morax gave no clue to the nature of the germ which probably caused it. In two cases, those of Kalt and Rohmer, streptococci were found either in the pus from the eye or from the inflamed glands, or both, but these were probably merely indications of secondary infection. My own observations in this line are very incomplete. In the three cases from which I have made cultures nothing of more than secondary importance was found. A microscopic examination of one of the large granulations in Case 3 showed the ordinary structure of a granulation tumor with rather more fibrous tissue than usual, and a number of giant cells, some of the latter containing vacuoles.

With regard to the therapeutics of the affection, all sorts of remedies, including the powers of Nature, have produced good results in the end, although in the cases where the whole upper tarsus was affected the progress has been slow. Parinaud recommends the use of nitrate of silver. Abadie has seen good results from the galvano-cautery; others recommend iodoform ointment. In my one bad case the sulphate of copper crystal seemed to do some good. In the cases where there are comparatively few but large granulations, undoubtedly the best treatment is to clip them off and cauterize any ulcerations that may exist.

With regard to the prognosis, while in the worst cases the prognosis is slow, no affection of the cornea nor other serious result has occurred in any case except that of Rohmer⁶; and this case was so exceptional in several ways that it is doubtful whether it really belongs in this class.

In designating this disease, I think it is best to waive the question of an animal origin and simply call it Parinaud's con-

junctivitis, because he was undoubtedly the first to recognize and describe the main complex of symptoms. From an historical standpoint, however, it is of interest to note that a case described by Goldzieher in 1882⁵ as lymphadenitis conjunctivæ was, in my opinion, the first case of this disease to be reported although Goldzieher himself does not seem to class it with his subsequent cases.

⁵Another possible exception may be tedious suppuration of the lymphatic glands. In the discussion of Despagne's case (*Loc. cit.*, p. 670), Abadie mentions a case which he for, to me, unsatisfactory reasons, thinks should be put into a separate class, in which the preauricular and cervical glands suppurated and kept suppurating for several months; the end apparently not being reached at the time of the communication. He suggests that this may have been a case of actinomycosis.

⁶*Centralblatt f. Augenheilk.*, 1882, p. 321.

THE DE ZENG REFRACTOMETER.¹

BY THOMAS A. WOODRUFF, M.D., C.M., L.R.C.P. (LOND.),

LECTURER ON OPHTHALMOLOGY POST-GRADUATE MEDICAL SCHOOL CHICAGO, ILL.

DE ZENG'S refractometer is constructed on the principle of the Galilean telescope, having a strong concave lens of 20 D. in each eye-piece, and a weak convex lens of about 10 D. sliding within the main tube, and by varying the distance between the two lenses, we are able to produce an effect similar to that produced by a concave or convex lens, as the case may be. The nearer the two lenses are to each other, the more divergent will be the rays of light, and on gradually separating them, a point is reached at which perfect neutralization of the lenses takes place. The further separation of the lenses will render the rays convergent.

In addition, this instrument has at its front end a revolving head containing concave cylinders, whose axis can be rotated to any degree desired.

¹Read before the Third Annual Meeting of the Western Ophthalmological and Oto-Laryngological Association, held at Chicago, Ill., April 7-8, 1898.

In testing the usefulness of any instrument for which the claim is made, that it enables us to accurately determine the amount of refractive error present, it is necessary that the results obtained by it should compare favorably with those arrived at by the methods already in use.

In reaching conclusions with De Zeng's refractometer, I have compared its working with the results arrived at by skiascopy and the test-lenses, a comparison which ought to be considered fair and perfectly reliable. In every case the existing error of refraction was determined first with the refractometer, and then by skiascopy and the test-lenses, using each method independently of the other. All cases were worked out with the aid of either a one per cent. solution of atropine or homatropine and cocaine discs. In the majority of instances the latter being used. In some cases the amount of ametropia was determined first without the use of a cycloplegic, but where an active accommodation was present, the results obtained were unsatisfactory.

In about 50 per cent. of the cases I found the three methods agreed accurately, but in the balance, and particularly where an oblique astigmatism was present, it appeared impossible for the patient to decide between several axes. Skiascopy and the test-lenses determined this much quicker and more acceptably. This was also true with reference to the amount of the astigmatism—the refractometer having a tendency to an over, rather than to an under, correction. Great care should therefore be exercised in its use. Best results being obtained by the weakest cylinder. If sufficient time could be devoted to each case, positive results could undoubtedly be obtained. On the other hand, the refractometer is of great assistance in verifying the results arrived at by the other methods. In three cases, at least, it was of assistance in enabling the patient to accept an accurate axis, which, with the test-lenses, varied 15 degrees.

In simple hypermetropia, it proved satisfactory, there being very little difficulty in developing the full amount of the error. Even before a cycloplegic was used, and where an active accommodative power was present, a greater part of the latent error was determined with little difficulty.

I have, therefore come to the conclusions that :

- (1) It is not a time saver.

(2) It is not always accurate in determining the amount and axis of the astigmatism.

(3) It is liable to produce an over, rather than an under, correction of astigmatism.

(4) In old people, or where a cycloplegic is contraindicated, it will prove of assistance.

(5) In myopia and hypermetropia, it is most satisfactory in determining the full amount of the error under a cycloplegic.

(6) It is expensive.

CHOROIDITIS AND CHOROIDO-RETINITIS IN YOUNG PERSONS.¹

BY A. C. CORR, M.D., CARLINVILLE, ILL.,

MEMBER MACOUPON COUNTY MEDICAL SOCIETY—MEMBER AND EX-PRESIDENT OF
ILLINOIS STATE MEDICAL SOCIETY—MEMBER AMERICAN MEDICAL
ASSOCIATION AND ITS OPHTHALMIC SECTION.

MY OWN observations in practice have not been such as to enable me to agree with the ordinary teaching of the books and didactic instructions on the subject of choroiditis. In those sources almost all cases of choroiditis that can not be unquestionably classed as rheumatic, gouty, or traumatic, are at once classed as syphilitic, and this latter is confirmed and a positive diagnosis is affirmed if any improvement or favorable modification follows the use of mercury and iodide of potassium. Now it is just this "*trump*" etiological diagnosis that I wish to inveigh against. I do not regard it as a display of good diagnostic ability to make a labored effort to draw the tail of some imaginary diathetic condition across every diagnosis one makes. I will not attempt to differentiate between the fancied yet elegant varieties of choroiditis that some have hypothecated, for if I did I should very soon become entangled in meshes from which I could not easily extricate myself; but I will utilize my own observations and describe the cases as they occur to me in a general and private practice.

¹Read before the Third Annual Meeting of the Western Ophthalmological and Oto-Laryngological Association, held at Chicago, Ill., April 7-8, 1898.

CASE I.—Miss Charlotte S., aged 18 years, no paramenia, health good, well nourished, called to know if she could have a pair of glasses to help her eyes. She said: "About two weeks ago, while doing some fancy needle work, and reading, my right eye got so I can not see as good with it." There was little pain, yet the eye was not quite comfortable. About two years ago, when in school, she had a similar trouble in the left eye. There was very little in the appearance of her eyes that would lead one to suspect any ocular trouble. The slight redness of conjunctiva of both eyes would ordinarily be regarded as a functional hyperæmia, as it was about the same as occurs in eyes of many persons when subjected to excessive use. R. E., V.=²⁰/_{cc}; L. E., V.=²⁰/_{xx}. Under mydriasis and cyclopegia refraction .50 D. hyperopia, both eyes, and the ophthalmoscope revealed an atrophic choroidal patch in the outer lower segment of the fundus of left eye, variegated black and white in ordinary figures and a margin of the appearance of *red-colored wool* around it. In the right eye—the one she was now complaining of—the vitreous body was not quite clear. The details of the fundus could not be well made out. There was deep hyperæmia of the retina, the vessels on the disc not quite so plain as outside of its edge. The margins of the disc could be defined fairly well for the condition of the vitreous body, and far toward the periphery and to the upper and temporal side could be discerned a large area of white reflex, with ill-defined borders.

She was ordered to not attempt to use her eyes for close work—sewing, or reading—to wear her correcting glasses all the time in doors, and to wear over them, when out, a pair of plain medium London smoke coquilles; to instill one drop of a four grain solution of atropia into each eye once daily to prevent accommodative and convergent effort; to take a calomel cathartic followed by a teaspoonful three times daily of Potas. Iod., ℥iv; Corros. Chlor., gr. ss; Trifolium Comp., to make ℥iv. At the end of twelve days she was given a teaspoonful four times daily for ten days of Tr. Digitalis, ℥j; Tr. Nuc. Vom., ℥j; Tr. Ext. Ergot, ℥ss; Syr. Aurant. Cort., to make ℥iv. After this she was ordered to take teaspoonful doses of Pyrophosphate of Iron and Calisaya Bark three times daily as long as the condition of the eyes seemed to require medication.

As the result of this treatment and continued caution and

care, I shall expect the hyperæmia of the retina to subside, the progress of the choroidal inflammation to stop, the choroid and retina to become normal in vascularity, and to become, in a sense, hardened and toughened, so as at the end of six months or a year, to endure ordinary functional activity; the atrophic spots and their coincident scotomata will, of course, remain. I advised the patient that she must not plan to occupy herself with literary pursuits or needle work.

June 30.—I have examined the case monthly since and the improvement has been as indicated in prognosis given.

CASE 2.—Miss Jessie W., a young lady aged 18 years. General good health. Slight paramenia. In school. Was referred to me by a jeweler to whom she had applied for glasses. R. E., V.= $^{20}/_{xx}$; L. E., V.= $^{20}/_c$; nor could she read anything but large type with left eye. Vision impaired for two months. No pain. Ophthalmoscope with mydriasis revealed haziness of vitreous body and a mottled area of the fundus just below the yellow spot in the left eye. The general hyperæmia of the retina and tissue around the mottled area looked like red-colored wool. Right eye normal. Refraction hyperopic 2 D. Correction ordered worn, and cycloplegia kept up by atropia, and plain coquilles worn when out of doors. I prescribed an alterative course followed by a vaso-motor tonic kept up for three months when the vitreous body had cleared up. The mottled area became more definitely defined and the surrounding choroid and retina normal, and the retina lost its *red-colored wool* appearance. She again entered school and in two years has had no return.

CASE 3.—Miss Lina G., aged 16 years. Good health. She is going to school. Within a week had noticed dull vision in left eye. The cause, course, pathological appearance, and results of the treatment were so similar to Cases 1 and 2, that I need not reiterate them.

CASE 4.—Miss Lucy M., aged 18 years; in good health. While striving in college to earn a prize in the study of Greek, she became cognizant of a dimness of vision in the right eye. She came early under observation. V.= $^{20}/_{xl}$ right eye and $^{20}/_{xx}$ left eye. Mydriasis and ophthalmoscope revealed retinal hyperæmia and just below and slightly to nasal side of yellow spot an area of red-wool appearance, and a lesser area of homogeneous red in its center. The vitreous body was not much affected. Refraction in both eyes emmetropic. I ordered

an alterative for a few days, followed by vaso-motor tonic. She was in her last year in college and could not afford to fall behind. So she was ordered to keep up use of atropia constantly to cycloplegia, and when studying to constantly wear + 2.50 D. on 4° pris. base in, pupil eye. She continued in school, with all outside reading left off, and all night-lessons read to her by an assistant. In three months the hyperæmia of the retina was removed and the homogeneous area of redness had given place to a choroidal atrophy, the white spot with black margins being about half as large as the disc. At the end of her college course—six months—she left off treatment and wore glasses indifferently. At the end of a year after, she took the position of instructor in Greek in the college, and now after three years has had no relapse, but uses her glasses when doing extra work.

CASE 5.—Lloyd R., a boy, aged 12 years, an elegant sprightly fellow, light build, fair complexioned. Style of intellectuality and pride of doting parents. In school. An omnivorous reader. Has asthenopia and headache much of the time. There is functional hyperæmia of palpebral conjunctiva. He complained of dull vision in right eye, of a month's duration, and has had a similar trouble in left eye two years before. V., L. E.= $^{20}/_{xx}$; V., R. E.= $^{20}/_{c}$. Refraction 2 D. Hypermetropia. Ophthalmoscope and mydriasis revealed signs of subsiding choroiditis, with dark mottled areas and surrounding red colored-wool appearances in fundus of right eye, and one covering the locality of yellow spot, central vision being lost; excepting this scotoma, the field of vision was normal. The left eye showed former choroiditis which had produced three patches of choroidal atrophy; there was no retinal hyperæmia as in the right eye. The condition of the left eye was evidently the result of the attack two years before. The tension of the globes was a little minus, probably due to loss of tone and vigor. He was prescribed an alterative for a few days, to be followed with vaso-motor tonic, alternated with an iron tonic, and mydriasis for two weeks. He was given his correcting glasses, and at the end of three weeks allowed to enter school, with some one to read the night-lessons to him, and all extra reading on his part prohibited. I examined his eyes once a month for three months, and the improvement continued, the hyperæmia leaving right eye, and the atrophic patches in the choroid becoming more defined.

I have here given a short history of five cases selected, as best illustrating choroiditis with retinal hyperæmia as I see it in private practice in young people, and without any possible syphilitic taint proximately or remotely, and as I believe originating from excessive functional activity of the eyes. It has long been recognized as a law in etiology, that an organ's liability to inflammation is increased according as its functional activity is increased. I am of the opinion that the choroiditis in this class of cases originates directly from the excessive functional activity of the eyes, predisposed to by diminished tonicity of the tissues and circulation, incident to indoor work, vitiated air, want of sunlight, and lack of general exercise; also, probably, indulgence in improper food.

The correction of errors of refraction and adjusting the eyes with lenses for the near point, relieving the necessity for convergence and accommodative effort when diseases of choroid or retina are threatened or are in active progress, I have not had brought to my attention before, but I believe it is a rational procedure in which by relieving the accommodative effort and convergence, the eye is made as passive as is possible, a condition entirely conducive to speedy relief of an inflammatory process aggravated or perpetuated by the perturbing influence of functional activity.

SOCIETY PROCEEDINGS.

THIRD ANNUAL MEETING OF THE WESTERN OPHTHALMOLOGICAL, OTOLOGICAL, LARYN- GOLOGICAL AND RHINOLOGICAL ASSOCIATION.

Discussion on paper read by DR. THOMAS A. WOODRUFF, of Chicago, entitled "*The De Zeng Refractometer*," (see page 171 of this number).

DR. FRANK ALRPORT (Chicago).—I have used the De Zeng refractometer somewhat and I regard it as a very useful adjunct. I do not regard it as accurate any more than any other method of arriving at errors of refraction. I would not depend upon my refractometer absolutely, neither would I depend upon skiascopy or upon the ophthalmometer. In fact, I would not solely depend upon any of these instruments for determining errors of refraction. At the same time, after using the refractometer in my office for several months, I have learned to like it, and should not like to do without it. I think it is a much more accurate method of estimating the axis of astigmatism than the one which is perhaps almost universally used, namely, the ophthalmometer. Perhaps I do not understand the working of the ophthalmometer as well as some of you do, but my findings by it, as to the axis of astigmatism in its degree, are quite inaccurate. Sometimes the test-lens and ophthalmometer vary many degrees, or even 90 degrees, possibly. I therefore feel that from my limited experience with the refractometer, that it is an instrument which is as valuable as any means we have at our command for estimating errors of refraction except, of course, the test-lenses under a mydriatic. I always regard this as a last resort. It is quite as necessary, however, to use a mydriatic in estimating errors of refraction with this instrument as with any other method.

DR. FRANCES DICKINSON (Chicago).—I have used the re-

fractometer but a few times and think there is a place for it. It is not to be relied upon as a last resort, in my judgment, unless we use a mydriatic. The method of skiascopy without a mydriatic leaves $\frac{1}{4}$ or $\frac{1}{2}$ D. uncorrected. So also will homatropine fail to give me full correction. I have not had the instrument long enough to make a comparison of its merits with the ophthalmometer. The latter gives us the degree of corneal astigmatism, while the refractometer is claimed to give us the intra-ocular as well as corneal, which is a desirable combination. It is even claimed that the refractometer gives us the entire amount of error, spherical as well as astigmatic. We know that the ophthalmometer gives us only the curvature error of the cornea, and that corneal astigmatism is the total astigmatism in 80 per cent. of the cases.

The age at which this instrument is of value in our work varies somewhat. In children and youth I have not obtained the same results with the refractometer that I get in old people or under a mydriatic. I regard the refractometer as an aid in my work, and I would not like to do without it. It seems, however, to influence the patient to use his accommodation, though intended to force complete relaxation by special construction. It has been a time-saver, in some cases. The test-lenses, a mydriatic, and the ophthalmoscope can always do the work completely and will probably never be displaced.

DR. A. E. PRINCE (Springfield, Ill.).—It is generally conceded that the test-lens in our work is the last court of appeal, and I make the appeal to begin with, of using the test lens. So far as I am concerned, there is no device that will do away with a reliable cycloplegic. If you get the axis of astigmatism by these devices you have to appeal to your test-lens before you are satisfied anyhow, and why not use the test-lens to begin with.

Discussion of paper read by DR. DUDLEY S. REYNOLDS, of Louisville, Ky., entitled "*The Science of Ophthalmology*," which appeared in the June number of this journal.

DR. FRANCES DICKINSON (Chicago).—I wish to thank Dr. Reynolds personally for his very excellent paper. It coincides with my views entirely. In the last case reported by the Doctor, where the patient was away from him, and he instructed

her to put homatropine in her own eyes, how often was she to use it, and in what strength?

DR. C. D. WESCOTT (Chicago).—I am very much pleased with what Dr. Reynolds has said, and I quite agree with him. I hope he will tell us a little more in detail his method of conducting examinations under homatropine. Did you state the age of the patient?

DR. REYNOLDS.—Thirty.

DR. WESCOTT.—I would also like to ask the Doctor how many examinations he finds necessary before getting satisfactory results, and how he uses homatropine. My experience leads me to believe that it makes some differences as to how we use it in patients of 25 or 35 years of age. I use atropine wherever I can and my practice is to have the patient come day after day, using a one per cent. solution of sulphate of atropine two or three times a day until I get constant results. I have, however, to examine a good many patients under homatropine and be satisfied with one test. It seems impossible for many business men and students to give me more than a Saturday. Of course, I do this under a measure of protest. My best results have been in persons up to 45 or 50 years of age, where I have used the sulphate of atropine and making repeated examinations on different days. I am particularly anxious to have Dr. Reynolds tell us how he does those things that we are all doing. We want to know how best to do it.

DR. A. E. PRINCE (Springfield, Ill).—What percentage of homatropine do you use?

DR. WESCOTT.—I use homatropine hydrobromate and cocaine hydrochlorate, 10 grains to the ounce, with 1 grain of salicylic acid to the ounce of sterile water. The patient introduces a drop of this solution in each eye every five minutes, and waits an hour from the first application, and in the next test I use the ophthalmoscope for examination of the fundus and determine the refraction with this as a guide. I use the Risley optometer in all my work. My homatropine cases I examine a second time on the next day if I can, but I frequently have to depend upon one test.

DR. J. E. COLBURN (Chicago).—Methods of examination I think must be largely personal. We have got to get at results in our own best way. A good deal depends upon the patient whom we have to examine and the conditions under which we

make that examination. These modify our action and the methods which we use. With young children atropine is the only thing that I feel any confidence in getting a result from, and two or three examinations extending over a period of four or five days are always necessary for a successful correction. With those who are trained to close observation, homatropine used much as Dr. Wescott has suggested gives me good results. But I am careful to examine not only once but two or three times on the same day. If I can get my patient to remain within control, I make two or three examinations under a mydriatic an hour or so apart. When I can not get them to give me two, three or four days for examination, then I always have them return for an examination on the second or third day, giving them the benefit of an after-examination when the pupil has contracted and the eye has resumed its functions. Then, if I find my patient will accept all of the correction, I give him all of it. If I find he will accept only a part of the correction, I give him that part with the understanding that he is to return again for further examination in case he has any annoyance. We must consider the personal equation in these cases. A dilated pupil does not give the accurate refraction that a contracted pupil does. Then, too, our results are going to be modified largely by the habits of patients, the position in which they hold their eyes in reading or writing, and their occupation. With the use of homatropine I am never certain that I am getting an accurate correction and I simply use it under a protest. In the use of atropine, if properly applied and long enough, I feel, after two or three examinations, that I get the whole refraction. I think errors of refraction require more time and care and consideration than are usually given them. We have to consider many things and be infinitely patient with all of our patients, and if a patient comes back to us with complaints, I do not think he is doing so for the fun of it. He may have ground for his complaint, and we should try to ascertain this. I have had some unpleasant results in my work, and I have found that I have not done my patients justice.

DR. PRINCE.—What strength of solution of homatropine do you use?

DR. COLBURN.—In young children I use 4 to 6 grains to the ounce. Of course, it depends largely upon the age of the

patient. In the case of an adult I would use it as Dr. Wescott has stated, in combination with cocaine.

DR. PRINCE.—I want to say a few words on this subject, and I believe I have an element of truth in what I have to say. I have heard oculists condemn homatropine and say it is insufficient in that they do not get good results from its use. I have read a great many discussions on this subject by different men in different societies, and I have tried to analyze every single case, and have found that those who object to it do not use sufficiently strong solutions. I may safely say that for ten years I have invariably used a solution of homatropine in the proportion of 5 per cent., which is a stronger solution than is usually recommended, and I make it up in proportion of about 24 grains to the ounce, calling it 5 per cent. I add to it 2 per cent. of cocaine, not enough to disturb the epithelium, but enough to diminish the irritation of the homatropine. I use homatropine in the manner suggested by Dr. Colburn. It requires some judgment in using it in the case of children and adults, and at the ages of ten years or younger I use five drops at intervals of five minutes; at the age of 20 years I put in four at intervals of five minutes. When properly used I find I get the same results from it that I get from the use of sulphate of atropia. I have re-tested my patients with the use of sulphate of atropia, and my opinion is that I get just as good results from homatropine as from sulphate of atropia.

DR. FRANK ALLPORT (Chicago).—We all seem to have our own methods in treating these cases. I am a firm believer in the efficiency of homatropine in some cases—almost all cases. I have used homatropine for a good many years back and have rarely been disappointed in its use. I have used in years past 4 per cent. solutions of homatropine. I do not usually graduate the amount of medicine which I use with the age of the patient. Of course, after a patient has passed the age of 40, I am a little bit chary of using a mydriatic of any kind unless the exigencies of the case require it. When I first began the use of homatropine I used a 2 per cent. solution, but was not satisfied with it at that time. I then increased it to 3 per cent. and finally to a 4 per cent. solution, and for many years I have been quite satisfied with its use. I use a drop or two of it upon the cornea every five minutes for half an hour, making about six applications in forty-five minutes. After the last applica-

tion I consider my patient ready for examination. I think it makes a great deal of difference in using a homatropine solution, whether you drop it loosely upon the lower conjunctiva, as I have seen it done in many instances, or whether you have the patient throw the head back and pull up the upper lid and drop it upon the cornea itself. I think probably that has been the observation of most of you. In using a mydriatic for any purpose whatever we get a more powerful effect by dropping it upon the corneal tissue instead of upon the lower conjunctiva, as is done carelessly in many instances.

For the last two or three years I have been using the homatropine discs recommended, I believe by Dr. Wood, and prepared by Wyeth. I do not remember the exact strength. I presume these discs are familiar to you all, and so it is unnecessary to explain them. I get better results from the use of these discs than from solutions of homatropine. I use a disc in each eye and have the patient keep the eyes closed for twenty minutes, then I introduce another disc, and in forty five minutes from the introduction of the last disc my patient is ready for examination. When it comes to examining the patient under the influence of a mydriatic, we must be guided by the general deportment of the eye. If our examination with the ophthalmometer—upon which I do not place a great deal of reliance, and with the test-lens are harmonious—I feel that the case has been properly refracted. If there are any discrepancies, then I use the sulphate of atropia solution, or if the patient expresses doubt in the use of the different lenses from time to time, if they are not exact in their answers, if they can not tell you exactly what spherical or cylindrical lens they wish, if they are not accurate in their axis, I consider that my patient's accommodation is not properly paralyzed, and then I use sulphate of atropia. I must say that it is very rarely necessary in my practice. The large proportion of cases that I re-fract are, so far as I know, properly refracted with reasonably good results—as good as the average man gets, I think, with the use of these homatropine discs. I am satisfied with their use and with the results I have obtained with the occasional use of sulphate of atropia where the exigencies of the case seem to require it.

DR. W. F. COLEMAN (Chicago).—This question is a very important one, in fact more important than any subject we

have discussed or will discuss at this meeting, and inasmuch as four-fifths of our work pertains to errors of refraction, I will ask the privilege of saying a few words. I am decidedly of the opinion that homatropine is not sufficient to completely paralyze the accommodation in clinical cases. If you say, in a physiological subject, yes, and that position was taken by Oliver, who has done more work in mydriatics than any man I know of. It was said that homatropine completely paralyzed the accommodation. Oliver was criticized for the position he took in regard to homatropine, and he was good enough to write an explanation in answer to the criticism, in which he stated that he never relied upon homatropine in his clinical cases. I have no better authority than he. In discussing the subject before the Chicago Ophthalmological Society, I made the remark referred to, and I was surprised at the unanimity of opinion on the part of the members in favor of homatropine. I asked, what proof have you that homatropine completely paralyzes the accommodation? Not one could give proof except to say the results were satisfactory in correcting the error of refraction. We are perfectly astonished sometimes in hearing patients say with what glasses they have comfort. But the question is, do we paralyze the accommodation with homatropine? To satisfy myself on this point I made a series of experiments in one hundred cases about five years ago. I put patients under a solution of homatropine in the proportion of from 8 to 20 grains to the ounce, four times a day, and proceeded to examine them shortly thereafter. My results were practically these, that not in more than one eye in twenty did I get full paralysis with homatropine. The variation was as much as $\frac{1}{4}$ D. in spherical error, and as much as $\frac{1}{2}$ D. to $1\frac{1}{2}$ or 2 D. in the cylinder. The axis was frequently different under homatropine. For my part, I have ceased to be interested in the subject or in discussions pertaining to it. How do we know after its use that a patient is properly refracted, and that the axis cylinder is correct?

I agree with the doctor who says that he does not rely upon the ophthalmometer. It is probably correct in 80 per cent. of the cases, but most of us rely upon the test-lens as a last resort.

DR. L. R. CULBERTSON (Zanesville, Ohio).—I have used homatropine in the strength of from 2 to 6 per cent. with oph-

thalmic discs, and in about one-half of my cases, in testing afterwards, I have found that the accommodation was not entirely relaxed. In recent years I have used the salicylate of atropine where the patient could spare the time to have atropinization. The salicylate has the decided advantage over the other salts of atropine in that it does not undergo changes with time.

DR. ALLPORT.—In order to defend what I said a moment ago, I wish to add a few words. I believe that I stated that of the various tests I consider the homatropine test was sufficient in most cases. I wish to remark parenthetically that my refraction cases are tested with the ophthalmoscope, the retinoscope, the ophthalmometer and with the test lenses, and if the results from these various methods are reasonably close, I consider the homatropine test is sufficient. There is no better method of estimating the axis of astigmatism than by using an over-strong lens, then grading it down to the cylinder which is necessary.

DR. COLBURN.—The strength of the solution I use has been made weaker and weaker, and the time of using it longer, because I find strong solutions are not so well borne. The absorption is not so perfect and the result in three hours is much better than the result from a strong solution in forty-five or fifty minutes.

DR. PRINCE.—Dr. Colburn speaks of using a weak solution and waiting three or four hours. As a matter of fact, by this time the first drop has lost its effect. I use a strong solution every five minutes, and make my examination at the end of from forty-five minutes to an hour after the last drop is in. In an hour or two from that the patients see much better, showing that the effect is beginning to pass off. It is important not to make the examination too long after the last drop is put in.

DR. A. ALT (St. Louis).—I want to say that I have done as Dr. Prince does, using homatropine solution in the proportion of from 6 to 10 per cent., but I have found it to be extremely irritating to many patients, producing nausea in some and fainting spells in others. In a large number of cases I did not succeed in getting the full cycloplegic effect. While efficient in some, we can never tell how it will act in a given case. I use it now only when I can not keep a patient under control for any length of time and can not use a stronger cycloplegic,

and always tell the patient that it may be insufficient. Yet the question arises, is it always necessary to have a full cycloplegic effect in order to give the patient proper glasses? I do not think so, as after all, the patient usually can not wear the full correction. I have become more and more accustomed to the habit of ordering my patients to come back to me after the effect of the cycloplegic has passed off and then prescribing the glasses which are most comfortable after having had the patient read in my office for 2 or 3 hours. They usually take a weaker glass, but after awhile they will be able to accept a stronger one. I think patients are much more satisfied when they become thus gradually accustomed to the wearing of their full correction than when they are at once given the full correction and have to worry for several months before they can comfortably wear their glasses.

DR. A. E. BULSON (Fort Wayne, Ind.).—I fully appreciate the position taken by Dr. Reynolds with regard to the use of homatropine. I have heard him discuss the subject on several occasions, and I know him to be a warm advocate of the administration of homatropine in the correction of errors of refraction. At the last meeting of this Association I took occasion to warmly commend the practice from the fact that I have employed this method for several years with apparently excellent results. During the past year, however, I have had occasion to go back on my former views. I have always used homatropin very thoroughly; but the discs manufactured under the formula of Dr. Casey A. Wood have been preferable, and I have used them every five to ten minutes, and instead of using four in an hour I have used from six to eight in an hour and a half. I supposed that I got complete suspension of accommodation or a cycloplegic effect, but during the past year, much to my surprise, several patients whom I had previously examined returned to me, and when I examined them under atropine I found that the effect of homatropine at the previous examination had not been all that I supposed it was. I have used homatropine in many hundreds of cases and I must confess that I was a staunch advocate of it for several years, but I do not believe that it is applicable in all cases, as I believe Dr. Reynolds maintains. I fully believe that in 75 per cent. of the cases it is sufficient, but that in the other 25 per cent. it will utterly fail in its purpose. I am very glad to hear

Dr. Alt say that he believes it is not always necessary to get the full cycloplegic effect in order to give a glass that is comfortable to the patient, or one that will answer all of the purposes of the patient. We too frequently prescribe glasses that are too strong for the patient and decidedly uncomfortable. I believe this is a very sad mistake in a large number of cases, and that the patient, instead of being benefited by the glasses, and instead of wearing them, will lay them aside on account of the discomfort in becoming accustomed to them. I was criticized very severely for a paper I presented at one time to the effect that I gave partial correction in cases of hypermetropia, and was accused of being half-hearted in my treatment; nevertheless, I believed this half-hearted treatment in some cases is far preferable to giving patients the full correction. I would, therefore, strongly condemn the practice of giving full correction when a patient admits that he is too uncomfortable with them.

DR. C. BARCK (St. Louis).—I must confess that the older I get the less frequently I use mydriatics. I would like to say a word in favor of a method which has not been mentioned today, namely, the direct method by means of the ophthalmoscope. In a large number of cases the accommodation relaxes entirely in the dark room under examination with the ophthalmoscope. This method is excellent if the examiner can relax his own accommodation and can rely upon his own relaxation. The younger members of the profession do not use this method as extensively as we do, simply because retinoscopy is easier to learn for the beginner. It would be a good thing if this method was practiced more. I never use mydriatics in patients above 40 years of age. I use them most frequently in children, and especially in those cases where there are indications of spasm of the muscle of accommodation. In the latter instances I prefer the direct use of atropia instead of homatropine.

I will not speak of the error which I hope has been given up entirely, namely, having in view the idea of making all persons, so to say, emmetropic. In young persons too strong convex glasses will be rejected, and it seems to me we must be guided by the age of patients, and in this connection I would refer you to the table of Hirschberg.

DR. DICKINSON.—Dr. Prince tells us that he has used homatropine for ten years, and has obtained excellent results.

I shall try the method he has described. In our large cities we have hundreds of opticians doing refractive work, which makes it probable that the oculists get a large proportion of cases that are not easily refracted without the use of some mydriatic. Whereas, if one's practice comes from the country, where the patients are not at desk work, not indoors all day, and not of a nervous temperament, and has not the competition of hundreds of opticians, I would not be surprised if he had a larger proportion of refractive cases that are well satisfied with manifest errors and satisfied with the correction that is obtained under homatropine.

DR. A. L. ADAMS (Jacksonville, Ill.).—I would like to know in what proportion of cases approximately the Doctor finds persistent spasm of accommodation after using homatropine, and how he knows the ciliary muscle is absolutely relaxed.

DR. B. E. FRYER (Kansas City, Mo.).—I do not believe in the majority of cases we can get complete paralysis of accommodation with homatropine, and I agree with what Dr. Colburn has stated regarding its use, because we can not get patients to wait long enough. Scopolamine is a satisfactory cycloplegic, and it does not dilate the pupil under its full effect so much as it acts on the ciliary muscle. We have a minimum, so to speak, of dilated pupil, and a maximum of cycloplegic effect.

One other point, I think is, important. In giving people glasses it is very essential to find out their muscular conditions and to make the lenses center. We may produce a distressing condition from improperly centering the lens.

DR. WESCOTT.—How do you use scopolamine?

DR. FRYER.—I use one-fifth of one per cent. dropped into the eye two or three times. Occasionally you may get a toxic effect in young people, but care should be taken that it is not used too strongly.

DR. DUDLEY REYNOLDS.—I deeply deplore the necessity of being too brief, and I fear that I shall not be able to reply fully to all of the questions that have been asked and the points that have been brought out. As to the first question, asked by Dr. Dickinson, as to how Mrs. T. used homatropine, and whether it was used in combination with cocaine or not, I have to say that I did not use it in combination. The solution used by Mrs. T. was 1 grain of hydrobromate of homatropine dis-

solved in 1 drachm of distilled water. Of this she was directed to have one drop fall directly upon the cornea every morning and every evening. She continued it the entire time between October, 1896, and April 30, 1897.

In reference to the method of using homatropine for its cycloplegic effect, I have been greatly interested in it, and have wondered at the various methods pursued. In October, 1897, I began a series of experiments, which were published either in the *Philadelphia Medical and Surgical Reporter* or *Philadelphia Medical Times* in a clinical lecture reported some time in January, 1880. I reached the conclusion, after an elaborate series of experiments, that the strength of homatropine solution best adapted to general purposes was 16 grains to the ounce of distilled water, and I used it in that strength for a number of years, but finally came to the conclusion that it was perhaps too strong, and so I reduced it to one-half that strength. I am now in the habit of using it in the proportion of 1 grain to the drachm, or 8 grains to the ounce. I mix no cocaine with the solution. I do not keep any of the solution on hand. I have it put up fresh when I am going to use it. The patient is brought into my office, and my clerk, who is skilled in this business, puts a drop of the solution in each eye, taking pains to raise the upper lid and let the drop fall upon the cornea at intervals of about one minute, until ten applications have been made. Then, at the end of forty-five or fifty minutes, and sometimes as much as sixty minutes elapses before I can get hold of the patient, I begin my test with the use of Risley's optometer which I esteem of great value, because it gives me fixed relations between the patient, the lens, and the test objects. I use an obscuring opaque disc for the purpose of covering one eye, insisting that the patient keep both eyes wide open. I have the patient read what he can with the uncovered eye. If he can read down to about the fourth line from the top, I conclude that about 1.50 D. of hypermetropia is present. If that does not correct the error of refraction, I ask him to read the last line of the card backwards; then I put Donders' opaque disc before his eyes. I place it vertically and ask the patient what he sees. If there is no discrepancy at all as he looks through the center of the slot, then I present a series of lenses, always preferring to begin with something higher than the patient will require, and

after having made an analysis of the refraction, by revolving the stenopæic disc, I am able at once to determine whether there is suspension of accommodation. If I find the patient can see apparently as well with one glass as another, I say to him, you are not ready, go back to the clerk and have her put the drops in your eyes three or four times more; then I wait thirty minutes, and test him. I think in about 90 per cent. of the cases as they come to us that homatropine, when used in the manner I have suggested, will answer the purpose. It can be used in too great strength, and the interval after the last application can be too much extended, or in testing you may approximate it. In persons whose accommodation is thoroughly paralyzed by the first series of application of drops, and in many other persons in whom it has to be repeated—in something like 10 per cent. of the cases under 30 years of age—it becomes necessary to prolong the use of the solution from day to day or substitute for homatropin sulphate of atropine, and I have scarcely determined in my own mind which is the better plan. Sulphate of atropine does not always succeed. It utterly failed in my own eyes. It develops irritation which prevents suspension of accommodation. Sulphate of atropine is not an universally acceptable cycloplegic. Homatropine used in the manner stated comes the nearest to fulfilling all requirements. I often find in persons above 60 years of age there is still considerable accommodative power. In my own eyes I had no manifestation of presbyopia, until within the past year I have been obliged to add a spherical plus lens to my cylinders, which are +3.25 D. axis 90° combined with 0.75 D. spherical.

Dr. Wescott says he uses sulphate of atropine in persons of from 45 to 50 years of age. I think by so doing he assumes great risk. I am afraid of it. I have had no experience with the use of salicylates in combination with either homatropine or sulphate of atropine. Solutions of homatropine prepared, say yesterday, are sometimes deficient in power for use to-day, consequently I have a solution made and use it within an hour after it is made.

I may say to you that I have never had constitutional manifestations from the use of hydrobromate of homatropine in children. In young ladies I have occasionally had serious nervous disturbances following its use, but the element of hys-

teria was too conspicuously apparent to justify the suspicion that the effect was due to the drug. I do not see how anyone can use successfully sulphate of atropine in the strength mentioned by one of the speakers. I have known 4 grains of sulphate of atropine to the ounce of distilled water produce toxic effects in a robust adult, not once, but many times. It flushes the face and quickens the respiratory movements. These symptoms pass off after awhile, and when the acute manifestations with disturbance of the cardiac and respiratory centers have passed away, then the cycloplegic effect is supposed to be present. I am sure it is less uniformly so than will be found to follow the use of homatropine in the manner I have stated. I base my opinion upon the results of a series of experimental observations painstakingly recorded. I have no occasion to make any change in the strength of my solution, or to follow the method of varying the strength of the solution, as between children and adults, excepting in persons above 40, in whom there is no strong hypermetropia. I direct the applications to be limited to half a dozen instead of ten, about a minute apart.

As to the use of the ophthalmoscope in determining errors of refraction, I take it for granted that very few gentlemen rely upon it.

It has been stated by Dr. Prince that he prefers a combination of cocaine with hydrobromate of homatropine. I would like to say that my experience with the use of cocaine is this, that it frequently gets into the fauces and produces discomfort and sometimes alarming symptoms and renders the cornea more or less opaque. It is, therefore, objectionable.

Dr. Colburn referred to the matter of adjustment of the lenses. Upon that point I lay great stress. The question of correct adjustment of the lenses is the first one to be considered. I have had great difficulty in past years in getting frames made with deep enough nasal curve on the one hand, or large enough at the base on the other hand, of the proper form to enable the patient to wear them in a fixed and constantly satisfactory position.

As to the use of scopolamine, I have had no experience and consequently have nothing to say regarding it.

With reference to the question of partial correction, I am opposed to it, excepting for those who have hypermetropia

and hypermetropic astigmatism. I require the patient to read with glasses which unite parallel rays of light, they may use any modification they please for distance, but for reading I insist upon full correction of all forms of hypermetropia. In hypermetropic astigmatism of more than 2.00 D. I find young persons are often unable to relax their accommodation for distance, then I direct — cylinders of half the amount of refraction of the correcting + lens, to be worn with axis at right angles, and the full correcting + lens for reading.

Discussion on paper read by DR A. C. CORR, of Carlinville, Ill., entitled "*Choroiditis and Choroido-Retinitis in Young Persons*," (see page 202 of this number).

DR. J. E. COLBURN (Chicago).—The paper of Dr. Corr's is interesting to me, because I have found quite a number of cases corresponding in clinical history and appearance to the ones described by him. I know that other gentlemen present have been making similar observations, and I would like very much to have them give expression to their thoughts if they are willing to do so at this time.

DR. C. D. WESCOTT (Chicago).—I can only say that I have been much interested in this class of cases. I have seen quite a number of them, and agree thoroughly with what Dr. Corr has said, that many of them are not traceable in any way to syphilis. I have absolutely been discouraged in my search for the cause in some cases. In others, I have attributed it to the taxing of the eyes when the general condition of the body was not up to par. The line of treatment which he has pursued is something like my own. I have put the eyes absolutely at rest, or as near as I could, and have done everything which seemed indicated to improve the general tone and purity of the blood. Some of the cases are unquestionably relieved by the proper use of salicylates in connection with absolute rest of the eyes. I have promoted elimination in all instances, as much as possible, while trying to increase the general nutrition, and improve the condition of the patient. In some cases I have been obliged to interdict the use of the eyes for months, and even a year in one case, and my ultimate results have been very much like those reported by the Doctor—very gratifying. If I had known the exact nature of this paper, I should have brought notes of my cases.

[TO BE CONTINUED.]

OPHTHALMOLOGICAL SOCIETY OF THE UNITED
KINGDOM.

CLINICAL EVENING.

H. H. SWANZY, FR.C.S.I., President, in the Chair.

THURSDAY, MAY 5, 1898.

Chip of Steel in the Eye, With Skiagraph.—MESSRS. ERNEST CLARKE and MACKENZIE DAVIDSON showed a case. The patient was struck by a chip of steel in the right eye in November, 1897. A scar could be seen in the cornea, and in the anterior and posterior portions of the lens capsule. The opacity in the lens had somewhat increased since, and vision was reduced from $\frac{6}{XII}$, when first seen, to $\frac{6}{XXIV}$. A skiagraph taken by Mr. Mackenzie Davidson showed that the piece of metal was lodged in the ciliary region at the lower part. On ophthalmoscopic examination a mass of exudation could be seen at this point. The skiagraphic exposure had now been reduced to 90 seconds, and in the case of a child to 1 minute.

Ophthalmoplegia Externa With Impairment of the Orbicularis Oculi.—DR. JAMES TAYLOR showed a case. Hughlings Jackson had first drawn attention to a case exhibiting weakness of the orbicularis in paralysis of the third nerve exemplifying Mendel's hypothesis that the ultimate nerve supply of the orbicularis was the the third nerve. Mention was made of the similar association between paralysis of the orbicularis oris and the hypoglossal nerve.

DR. BEEVOR said that he had shown a case at this Society a few years ago in which there was double ptosis and weakness of the orbicularis; it was probable that in most of the cases where the nucleus of the third nerve was involved the orbicularis was affected. Dr. Taylor's case was important, as other muscles which had a nerve supply originating in the bulb—those of the palate—were affected; he believed this to be rare.

MR. FLEMMING said that anatomists were now agreed on anatomical evidence that the orbicularis was supplied from the third nerve nucleus.

Rudimentary Development of the Iris.—DR. JOHN GRIFFITH showed two cases. The patients were brother and sister, in whom the iris was present only as a rudimentary band, which was absent in the lower outer part entirely; the choroid and ciliary body were normal. In one of the cases there were anterior polar cataracts, without sign of previous perforation of the cornea, and the lenses were slightly displaced upwards. In both patients there was defect of the enamel of the teeth, and there was a history of fits.

MR. SYDNEY STEPHENSON had shown at the Society two brothers with aniridia, in whom there was deficiency of the enamel of the teeth, known to dentists as hypoplasia.

Conical Cornea Treated by Galvano-Cautery.—MR. G. A. CRITCHETT showed a case. The improvement in vision had been in the right eye from $\frac{6}{LX}$ to $\frac{6}{IX}$, and in the left from $\frac{6}{LX}$ to $\frac{6}{XXIV}$. In the last series of cases, about 15 in number, he had tried not to perforate the cornea; he used the cautery wire at the lowest possible red heat, so that not much more than the epithelium was affected; the whole area intended to be affected was burnt with this, then at a slightly greater heat he burnt a smaller disc within this area; then at a higher temperature still he burnt the center at a point only. During the first burning the aqueous disappeared, and the iris came into contact with the cornea. He used a flat, medium-sized point except for the central and last burning, when he used a small one.

MR. HARTRIDGE asked the reason for using the different degrees of heat; he was in the habit of using one temperature only, and had never seen the aqueous disappear.

DR. CRITCHETT said he thought a better cicatrix was obtained by this method.

Remarks were made by MESSRS. DOYNE, GUNN, and GRIFFITH.

Case of Retinitis Circinata.—MR. FISCHER showed a case. The patient was a woman, aged 66 years, unconscious of anything wrong with her left eye. She was healthy, and had no ascertainable kidney disease. The right eye was quite normal; in the left there was well-marked retinitis circinata completely surrounding the yellow spot, which was degenerated.

MR. LAWFORD thought this case was not typical inasmuch

as there was little or no change at the yellow spot, and the band of exudation was distinctly raised.

MR. GUNN thought this one of the manifestations of old-standing œdema of the retina, and that it was similar in nature to the asterisk seen in renal retinitis.

MR. DOYNE thought that the exudation was decolorized blood.

MR. HARTRIDGE had shown a case at the Society some years ago; the exudation had since entirely disappeared.

Peculiar Condition of Lens.—MR. MARCUS GUNN showed a child who had a cataract in the right eye which had been diagnosed in early life, but nothing had been done for it. The right iris was much lighter in color than the left; there was punctate deposit on the back of the cornea; the center of the pupil was like an ordinary opaque membrane, with holes in it through which the O. D. could be seen with + 20 D. The peripheral part of the lens appeared like a brown grey granular exudation raised above the level of the central capsule.

Specimens, Etc.—MR. ROCKLIFFE showed (1) Two specimens of Cystic Retina; some of the cysts were between the inner and and outer nuclear layers, and the others were difficult to locate owing to degeneration of the retina; (2) Specimens of Pseudo-Glioma.

Remarks were made by MR. DEVEREUX MARSHALL.

SURGEON-CAPTAIN HERBERT showed specimens of Epithelial Xerosis of Conjunctiva.

MR. DEVEREUX MARSHALL and MR. RIDLEY showed specimens of Persistent Hyaloid Artery With Atypical Development of the Vitreous.

DR. G. H. HOGG showed a case of Polycoria.

THE AMERICAN JOURNAL OF
OPHTHALMOLOGY.

VOL. XV.

AUGUST, 1898.

NO. 8.

ORIGINAL ARTICLES.

A NEW COMBINATION CHART. FOR THE EXAMINATION OF SCHOOL CHILDREN'S EYES AND EARS BY TEACHERS.¹

BY FRANK ALLPORT, M.D., CHICAGO, ILL.,
PROFESSOR OF OPHTHALMOLOGY IN THE CHICAGO POLICLINIC, ETC.

AS AN ADJUNCT to my method for the systematic examination of school children's eyes by teachers, I have prepared a special compound test card, which I beg leave to submit to the profession.

It is based upon the standard types of Snellen, and is called "A Visual and Aural Chart for Schools." Roman numerals are on one side of each line and Arabic on the other. As, notwithstanding frequent instruction, and printed directions, I am frequently asked by teachers, "Which is the proper line to test at twenty feet?" I have had printed under the twenty-foot line, these words: "This line should be seen by a normal eye at (XX) feet," which would seem to make the matter sufficiently plain.

Under the last line, on the card proper, is a half broken line, at which point the lower portion of the compound card, should be severed from the upper portion. Just under this line are printed the words, "Please detach by breaking on this line."

The card which is thus detached contains the teachers'

¹Read before the Third Annual Meeting of the Western Ophthalmological and Oto-Laryngological Association, held at Chicago, Ill., April 7-8, 1898.

instructions as to how to proceed with the tests. The upper or long card, containing Snellen's types, is the testing card, and should be hung on the wall when in use.

Upon the lower card of instructions is printed the following matter, most of which is already familiar to those who have been used to this method. Some additions have, however, been made, as, for instance, the instruction not to expose the card except when in use, the advice not to examine first-grade children, the question as to the existence of strabismus, the questions for the development of ear diseases, with their frequent nose and throat obstructions, etc.

(Please detach by breaking on this line).

INSTRUCTIONS FOR THE EXAMINATION OF SCHOOL CHILDREN'S EYES AND EARS. FOR USE OF PRINCIPALS, TEACHERS, ETC.

After the method proposed by Dr. Frank Allport, of Chicago, Ill.

Do not expose the card except when in use, as familiarity with its face leads children to learn the letters "by heart."

First-grade children need not be examined.

The examination should be made privately and singly, in a room apart from the general school session.

Ascertain if the pupil habitually suffers from inflamed lids or eyes.

Children already wearing glasses should be tested with such glasses properly adjusted on the face.

Place a card of Snellen's Test Types on the wall in a good light; do not allow the face of the card to be covered with glass.

The line marked XX (20) should be seen at 20 feet, therefore place the pupil 20 feet from the card.

Each eye should be examined separately.

Hold a card over the eye while the other is being examined. Do

not press upon the covered eye, as the pressure might induce an incorrect examination.

Have the pupil begin at the top of the test-card and read aloud down as far as he can, first with one eye and then with the other.

If the pupil does not habitually suffer from inflamed lids or eyes, and can read a MAJORITY of the (XX) 20 test-type with each eye, and does not, upon inquiry, complain of HABITUALLY tired and painful eyes and headache after study, his eyes may be considered satisfactory. But if he habitually suffers from inflamed lids or eyes, or can not read a MAJORITY of the XX (20) test-type with BOTH eyes, or habitually complains of tired and painful eyes or headache after study, a card of information should be sent to the parent or guardian.

FACTS TO BE ASCERTAINED.

EYES.

1. Does the pupil habitually

suffer from inflamed lids or eyes?

2. Does the pupil fail to read a majority of the letters in the number XX (20) line of Snellen's Test Types, with either eye?

3. Do the eyes and head habitually grow weary and painful after study?

4. Is the pupil probably "crossed-eyed?"

EARS.

5. Does the pupil complain of earache in either ear?

6. Does matter (pus) or a foul odor proceed from either ear?

7. Does the pupil fail to hear an ordinary voice at 20 feet in a quiet room?

8. Does the pupil fail to hear the tick of a good-sized watch at 3 feet with either ear in a quiet room?

9. Does the pupil fail to breathe properly through either nostril?

10. Is the pupil an habitual "mouth breather?"

If an affirmative answer is found to ANY of these propositions, the pupil should be given a card or letter of warning to be handed to the parent, which should read something like this:

DEAR SIR—

After due consideration, it is believed that your child has some Eye—Ear* disease, for which an Eye—Ear* Doctor of recognized standing should be consulted. If you feel unable to consult one at his office, a Dispensary will do the work free of charge

It is earnestly requested that this matter be not neglected, as children with Eye—Ear* dis-

eases can not attain the best results in school.

Respectfully,

Principal.....School.

*Either the word "Eye" or "Ear" may here be crossed out, as may be appropriate for the case. If the pupil has presumably BOTH an Eye AND Ear disease, BOTH words may be left, and the space between the words "Eye" and "Ear" should be filled in with the word "and."

If school authorities desire to have these cards of warning printed (which of course facilitates the work), the names, addresses and office hours of the various free dispensaries may be printed upon the backs of the cards, if it is so desired. If this is done the names of ALL the reputable dispensaries in the city should of course be included. Teachers should not exert their influence in favor of any particular Eye or Ear Surgeon or Dispensary.

It will be observed that these cards are non-obligatory in their nature. They do not require anything of the parent, who is at perfect liberty to take notice of the warning card or not, as he sees fit. They simply warn the parent that a probable Eye and Ear disease exists, thus placing the responsibility upon the parent.

Principals and teachers are urged to impress upon pupils and parents the necessity for consulting reputable Eye and Ear Surgeons and not UNPROFESSIONAL TRADES-PEOPLE.

It will be noticed that the language is plain, and the instructions simple, in order that they may be easily comprehended by the laity into whose hands the cards will naturally fall.

The "facts to be ascertained" have been so worded that an affirmative answer to any of them will indicate that the pupil needs a warning card to take to the parent.

I have several purposes in view in producing this chart. My original method for conducting these tests was to have an oculist appointed by the board of education, who should superintend the tests, collect data, make reports, etc. The examinations were to be made by principals and teachers, and pupils found defective should have their names, conditions, etc., enrolled upon what is called the "Statistical Blanks," upon which, after due time, is to be written the result of treatment upon the eyes, health and general conduct of the pupil. These blanks are handed to the superintendent and board oculist who keep them on file and report on their findings to the board of education.

This is the plan I have advocated and still advocate, but boards of education are not always amenable to argument, and their objections take many forms. Some will not hear to the plan at all; some are willing to have an oculist instruct the principals as to the workings of the plan, but wish him to have no further connection with the schools; some adopt the plan, but will not ask the principals to perform the extra labor of making out the "Statistical Blanks;" some will not allow the names of the dispensaries printed on the backs of the warning cards, etc.

The combination card which I now propose harmonizes with most of the objections, and I think can be adopted under most circumstances.

Many teachers are interested in this work, and are constantly inquiring how they may do it in places where the board has taken no official action along these lines. They may simply purchase one of these combination cards for twenty-five cents, containing both the test-types and instructions, and proceed with the work in their own room. To this there can certainly be no objections, as the tests are absolutely harmless in every particular.

VISION CHART ● FOR SCHOOLS
PUBLISHED BY ALMER COE OPTICIAN 65 STATE ST CHICAGO.

SNELLE'S

CC	E	200
C	B C	100
LXX	N L D	70
L	R T P E	50
XL	E Z F B D	40
XXX	C T L G F O	30
XX	E O P Z F R D A <small>(This line should be seen by a normal eye at 100/30 feet)</small>	20
XV	R V T Z F H D B K O P N	15
X	N C A T G L P R V Z Y E	10

INSTRUCTIONS FOR THE EXAMINATION OF SCHOOL CHILDREN'S EYES AND EARS.
FOR USE OF PRINCIPALS, TEACHERS, ETC.

1. Have good lighting and an examination table. The children should be made to sit upright and straight in a room open to the light. The child should be seated at the table with the eyes of the child naturally looking toward the light. The child should be seated at the table with the eyes of the child naturally looking toward the light. The child should be seated at the table with the eyes of the child naturally looking toward the light.

2. These are given to be broken promptly through other cards? 3. In the case of bilateral blindness? 4. In the case of unilateral blindness? 5. In the case of bilateral blindness? 6. In the case of unilateral blindness? 7. In the case of bilateral blindness? 8. In the case of unilateral blindness? 9. In the case of bilateral blindness? 10. In the case of unilateral blindness?

FACTS TO BE ASCERTAINED

1. Does the child naturally follow the light? 2. Does the child naturally follow the light? 3. Does the child naturally follow the light? 4. Does the child naturally follow the light? 5. Does the child naturally follow the light? 6. Does the child naturally follow the light? 7. Does the child naturally follow the light? 8. Does the child naturally follow the light? 9. Does the child naturally follow the light? 10. Does the child naturally follow the light?

1. This section of the card should hang on the wall.
2. The two portions of the card should be separated or broken apart on this line.
3. This section of the card contains the printed instructions to teachers, and should be kept for their personal use.

In case a board does not wish to burden its principals with statistical reports, but wishes the work done in other particulars, these cards may be purchased by the board, which will cover the entire expense, excepting the warding cards.

In the tests in the Chicago schools, which the Chicago Board of Education has requested me to superintend, the principals will not be called upon to render statistical reports, therefore my new combination card will be used. They will, however, be required to let me know how many children were examined, how many were found defective, how many they know to have been benefitted as a result of the tests, and what are their general ideas, as to the usefulness, etc., of the plan.

I do not in any sense depart from the original and more systematic plan, which I have so many times recommended, but in case the ideal method can not be used, this one will, I believe, render satisfactory service, as what we really wish to achieve is the benefit to the coming generation, and not the compilation of statistics.

The cards have been printed for me upon extra thick cardboard by Mr. Almer Coe, Optician, 65 State St., Chicago, Ill., from whom they may be obtained. I submit a picture of the chart.

THE USE OF SUPRARENAL CAPSULE EXTRACT
IN MINOR EYE SURGERY.*

BY JOSEPH A. MULLEN, M.D., HOUSTON, TEXAS,

FELLOW OF THE AMERICAN LARYNGOLOGICAL, RHINOLOGICAL AND OTOLOGICAL
SOCIETY.

FOR the amelioration of pain and the prevention of bleed-
ing in minor eye surgery, I desire to offer some observa-
tions of my own as well as others confirmatory of those re-
ported by Dr. W. H. Bates¹ on "The Use of Extract of Supra-
renal Capsule in the Eye."

The principle upon which its physiological action depends
is the contractile power of the extract upon the arterioles—a
vaso-constricting action—thereby retaining the absorbed co-
caine and increasing its contractile and anæsthetic properties.

It reduces the extra-ocular tunics to a state of ischæmia,
preventing hæmorrhage, and maintaining anæsthesia by keep-
ing the cocaine locked within the tissues. Locally applied,
it is never followed by any constitutional manifestations,
when given hypodermatically it is, however, attended with
dangerous symptoms. The face becomes livid and there is
great pain in the chest and head. These untoward effects are
unmistakably due to the action of the suprarenal extract upon
the small arterioles.² It also decidedly increases blood pres-
sure.³ According to Drs. J. J. Abel and A. C. Crawford,⁴ the

*Prepared for the Third Annual Meeting of the Western Ophthal-
mological and Oto-Laryngological Association, held at Chicago, Ill.,
April 7-8, 1898.

¹ New York Medical Journal, May 16, 1897.

² Op. Cit.

³ This fact, knowingly or unknowingly, has been clinically utilized
by Mankowski (St. Petersburg Med. Woch., October 30), who recom-
mends that a solution of the extract should always be on hand at chlo-
form narcosis. He chloroformed dogs until the circulation and respira-
tion had ceased. Thirty seconds afterwards he injected a solution of
the extract into the jugular vein, restoring them to life. (Jour. Amer.
Med. Ass'n, February 5, 1898).

⁴ Johns Hopkins Hospital Bulletin, No. 76, July, 1897.

blood-pressure-raising constituent is an active sulphate, a pyridine base or alkaloid.

The preparation I used is from the supra-renal capsule of sheep and dispensed to the profession as a powder by Armour & Co. The solution is made by dissolving 5 grains in 1 drachm of cold saturated boric acid solution and filtered. Fresh solutions should be prepared for each operation. It keeps very poorly and soon becomes foul smelling. Locally, its action is purely one of contraction; it enhances and prolongs the contractile effect of cocaine, after which solution it is always used. The solution is not at all irritating, but rather imparts a cooling sensation to the conjunctival membrane. A solution of cocaine, 5 per cent. in strength, is instilled into the eye and allowed to remain for ten minutes, after which the solution of suprarenal capsule is put in also and in fifteen minutes the surface is ready for operation, *i. e.*, when complete ischæmia has taken place. As is well known, cocaine produces on mucous surfaces a contraction of the capillaries, while the extract of suprarenal capsule increases this action to such an extent that when the tissues are incised no hæmorrhage occurs, while without the extract, bleeding takes place and the anæsthetic effect of cocaine passes away with the flow of blood. The action of the suprarenal capsule on the arterioles is further supplemented by contraction of the conjunctival connective tissue pulling the membrane down upon the sclerotic preventing, even if the hæmorrhage be slight, the extravasation of blood beneath the conjunctiva.

These physiological effects materially increase the clinical usefulness of the extract. It bleaches the vessels in the pterygium and conjunctiva making the line of demarkation between the two quite distinct, isolating the former so its removal is readily accomplished. It, however, does not immobilize the tissues so that the suturing becomes difficult. It also greatly lessens secondary swelling, and in some unknown manner kindly induces more rapid healing, so that the sutures may be taken out earlier and the parts returned to their normal position.⁵

⁵ See article by author, "The Clinical Observation on the Use of the Aqueous Extract of Suprarenal Capsule in Operations Within the Nasal Chambers." (International Clinics, January, 1898).

When using the extract for tenotomies proceed the same way as in removing the pterygium until the capsule of Tenon is reached, then instill more cocaine solution, after which the suprarenal capsule is used as before. In this way repeated testing of the muscle can be made until sufficient has been cut for purpose indicated. When proceeding in this manner the ease to the operator and comfort to the patient with which the tenotomy is attended is surprising, and especially is it advantageous as there is very little hæmorrhage or pain.

The swelling after excision of pterygia and tenotomies seems to be milder than when cocaine alone is used, especially when cracked ice is applied to the parts after the operation. When operating on the drainage apparatus of the eye, cocaine solution is first instilled into the conjunctival sac and then a small quantity of the same is injected into the lachrymal sac and nasal duct. This is followed by a similar instillation and injection of the extract. Fifteen minutes afterwards, the canaliculus can be opened and the stricture of the nasal duct incised. The operation is almost bloodless and painless. A decided improvement over the use of cocaine alone. Its advantages over the use of cocaine alone are—first, to increase the anæsthesia of cocaine; second, it, with cocaine, produces ischæmia of the mucous tissues; third, in some kind way it modifies post-operative swelling; fourth, it materially enhances rapid healing of the parts. I have never seen any evidences of cocaine toxæmia when the extract had been used.⁶

These advantages are quite valuable and should entitle the suprarenal capsule to a place on our list of established medicinal substances for use in the eye.

The astringent action lasts from one hour to an hour and a half, and is followed by no injurious effects to the cornea, etc. The extract does not cause dilatation or contraction of the pupil, and is devoid of any action on accommodation, and I believe, as Dr. Bates does, that within the limits of its sphere of activity, there is absolutely no other substance which can take its place in minor operative procedures on the eye and its appendages.

⁶Op. Cit.

A CASE OF HYPEROPIC ASTIGMATISM CHANG-
ING TO MIXED ASTIGMATISM AFTER
TENOTOMY OF THE INTERNAL
RECTI MUSCLES.

BY J. ELLIS JENNINGS, M.D., ST. LOUIS, MO.,

SURGEON TO THE EYE DEPARTMENT OF THE ST. LOUIS EYE, EAR, NOSE AND
THROAT HOSPITAL—OPHTHALMIC AND AURAL SURGEON TO THE
ST. LOUIS MULLANPHY HOSPITAL.

MISS H. G., consulted me October 17, 1897, in regard to a slight periodic internal squint, which her friends said was more pronounced at night. Six years ago she had purchased a pair of glasses from an optician, but had only used them for close work.

O. D. V., $\frac{5}{VI}$ — with + 1.00 D. cyl. ax. $120^\circ = \frac{5}{IV}$.

O. S. V., $\frac{5}{V}$ — with + 1.00 D. cyl. ax. $60^\circ = \frac{5}{IV}$.

Muscle Balance.—No hyperphoria. Esophoria 8° . Abduction 5° . Adduction 35° . Exercise of the muscles with prisms for a few days brought abduction up to 14° , and adduction to 50° .

Refraction.—The refraction was carefully estimated under homatropine with following result:

Retinoscopy: O. D. $\begin{array}{|c} +2.50 \\ \hline +1.50 \end{array}$ O. S. $\begin{array}{|c} +2.50 \\ \hline +1.50 \end{array}$

O. D. + 1.00 D. sph. \odot + 1.00 D. cyl. ax. $120^\circ = \frac{5}{IV}$.

O. S. + 1.00 D. sph. \odot + 1.00 D. cyl. ax. $60^\circ = \frac{5}{IV}$.

After the eyes had recovered from the influence of the mydriatic, vision still remained $\frac{5}{IV}$ with the above correction, so it was ordered for constant use and the patient instructed to report in six months.

May 20, 1898. Patient has worn her glasses constantly with great satisfaction, and a test shows vision of $\frac{5}{IV}$ with each eye. The muscle balance is unchanged, *i. e.*, 8° of esophoria.

May 22. At the earnest solicitation of the patient, I consented to do a partial tenotomy of the left internal rectus muscle; but after clipping for some time, with little result, I finally divided the entire tendon and surrounding attachments. The

operation still left 2° of esophoria which, in a few days, had increased to 6°. I now decided to make a partial tenotomy of the right internal rectus, but was forced, before any effect was apparent, to completely divide the tendon. This complete division resulted in an exophoria of 10°, which was reduced to 3° by stitching the tendon to a point near its former position. When the stitch was removed a few days later the exophoria had entirely disappeared and muscle balance was perfect. While the operation was satisfactory from a cosmetic standpoint it resulted in a most extraordinary and unaccountable change in the refractive condition of the eyes. Even before I had quite finished the tenotomies the patient complained of poor vision and that she could not wear her glasses any more, but I did not pay very much attention to her statements. But about a week later she again mentioned the matter and on testing found vision $\frac{5}{xx}$ with glasses. The refraction was carefully estimated under homatropine and was as follows:

Retinoscopy: O. D. $\frac{+2}{-1}$ O. S. $\frac{+2.50}{+0.25}$
 O. D. — 1.50 D. sph. \odot + 2.50 D. cyl. ax. 105° = $\frac{5}{IV}$.
 O. S. — 0.50 D. sph. \odot + 2.50 D. cyl. ax. 75° = $\frac{5}{IV}$.

Whether the change in one meridian from hypermetropia to myopia immediately after the operation was due to a bulging from the altered position of the lateral muscles or whether the rays of light passed through an area of the cornea which differed in refraction from the first area, is an open question.

ERRATUM.

On page 171 of the June number, second paragraph, sixth line, read *Holden* for Weeks.

SOCIETY PROCEEDINGS.

THIRD ANNUAL MEETING OF THE WESTERN OPHTHALMOLOGICAL, OTOLOGICAL, LARYN- GOLOGICAL AND RHINOLOGICAL ASSOCIATION.

Discussion on paper read by DR A. C. CORR, of Carlinville, Ill., entitled "*Choroiditis and Choroido-Retinitis in Young Persons,*" (concluded from July number).

DR. J. P. WORREL (Terre Haute, Ind.).—The importance of the choroidal and retinal troubles in school children, who use their eyes a great deal, can not be overestimated. The frequency with which changes take place in the retina becomes obvious. Everyone who has been called upon to study the eyes of children for statistical purposes, and the frequency with which choroidal and retinal changes are found, has been impressed with the importance of the subject. You are doubtless familiar with the results of Dr. Risley's investigations in school children in Philadelphia, which were made with a view of ascertaining what relation there was between myopia and these changes in the eyeground. Some recent investigations of my own have substantiated his statements, and in more than 50 per cent. of the cases of hypermetropia and astigmatism we find some evidences of retinal and choroidal changes, and around the optic disc. In many of them, however, we will find a low degree of vision, and when we come to search for the objective changes, we can not always find them. Perhaps there is a spotted or granular appearance of the retina, but even this may be absent. Absolute correction of the refraction, putting the eyes under atropia, the use of alteratives, and rest for the eyes constitute the line of treatment.

DR. J. E. COLBURN (Chicago)—I have now under observation a young girl whom I have known for fifteen years. I first saw her when she was a child, 3 years of age, and again

at the age of 13, at which time I refracted her eyes, giving her $^{20}/_{xx}$ vision. She had eye-fatigue and an error of refraction, 1 D. of hypermetropia. I gave her correcting glasses. She entered into a boarding-school. She did not wear the glasses, and soon she was complaining of her eyes and very much lowered in general tone. I found that all of the functional activities of the different organs were being interfered with. It was not until I increased the renal activity that I had any result so far as the eyes and general improvement were concerned. But just as soon as I succeeded in improving the general nutrition and tone of the patient, her vision came up to and is now $^{20}/_{xxx}$.

DR. A. C. CORR.—There seems to be a large per cent. of similar cases, so far as my observation goes, and so far as I can gather from the literature of the subject, in which the cause is not accounted for. I have given my view of the cause of this disease as originating in the functional activity of the eye itself. There seems to be an inborn condition or weakness of the ocular tissues that makes the eyes of one child less resistant than those of another. One child is tough and robust, the other is frail, and this condition of the eyes exists without there being a gouty, rheumatic, or syphilitic history. I believe excessive functional activity of the eye is a means of accounting for the trouble I have described, and I do not find in our text books illustrations of this condition of the retina and choroid, as I have seen it. I have never seen illustrations of such patches, the retina and choroid exhibiting a peculiar wool-colored or plush-like appearance, as I saw it in the case I have described. The treatment I have advised and carried out is to have these patients absolutely refrain from active use of the eyes. If this can not be done, it may be necessary to paralyze the ciliary muscle with atropia, and prescribe correction at the same time for the near work, so that the eye can not be used for accommodation, and have a prism added so as to render it unnecessary for the eye to converge. I endeavor to put the eye in such a condition that it can be used without strain. In this way we relieve the tension of the circulation by the paralysis of the accommodation and these young patients to go on comfortably with their exercises.

Discussion on paper read by DR. H. V. WUERDEMANN, of Milwaukee, Wis., entitled "*Case of Angio-Sarcoma of the Orbit, With Metastases in the Skull, Etc*" (Paper not received).

DR. A. ALT (St. Louis).—I am somewhat astonished to find that the Doctor does not consider the orbital tumor the primary one. Usually in these cases the orbital tumor is the first, and the others are metastatic tumors. As in the Doctor's case there were no physical signs of disease of the abdominal organs when he first saw this patient with orbital tumor, the original seat of the tumor can not have been in the abdominal cavity.

I suppose everyone who has had opportunity to see such cases of orbital sarcoma knows that it is almost useless to operate, unless by evisceration of the whole orbital contents. Only, if we are able to remove all of the diseased tissue in this manner, is there a chance of success. I have taken occasion to report two cases similar in nature, in which I operated on a primary tumor in the orbit. In the one case I thought I had been able to remove all of the diseased tissue, and yet within three months after operative interference, the patient was brought back to me with such a large tumor that I refused to operate again. The patient then went from my hands into those of a Christian science healer in St. Louis, and I have been informed that a short time thereafter metastasis occurred in the abdominal organs and the patient died. So far as my acquaintance and knowledge with these cases go, the primary seat of the tumor is usually in the orbital tissue, and the tumors which develop in the abdominal cavity are secondary tumors from metastasis.

DR. WUERDEMANN.—This case is probably unique, because of an angio-sarcoma appearing in a very young child, and also that it appeared in the connective tissue back of the kidney, rather than in the connective tissue elsewhere in the body.

I have had another case of small round-cell sarcoma, non-pigmented, in which the eye was enucleated for inflammation with no other diagnosis having been made. The patient, a lady, aged 51 years, was brought to me later with a tumor having developed in the orbit about the size of an eyeball. Total exenteration of the orbit was done, and at the time there was no involvement of the glands, the liver or any other part of

the body. The optic nerve was divided close to the commissure, and it cut like celery.

At the microscopical examination cells were found infiltrating and involving the optic nerve. Recurrence did not occur in this case for two and one-half years. The disease, however, finally recurred in the liver, and tumor cells were found in practically all the tissues of the body. Recurrence also took place in the orbit, close by the tear duct. The patient finally died of inanition. The cause of death in the case of the child was meningitis.

EVENING SESSION, FRIDAY, APRIL 8, 1898.

PRESENTATION OF CASES, MICROSCOPICAL AND PATHOLOGICAL SPECIMENS, AND NEW INSTRUMENTS.

ADENOMA.

DR. A. ALT (St. Louis).—I have here under the microscope a tumor concerning only one ciliary process, accidentally found in the eye of a patient who died from pneumonia. Strange to say, I found the same kind of tumor also in the other eye of this individual, also confined to one single ciliary process. The nature of the tumor I am not sure about, as yet. It looks, at a superficial glance, as though it is an adenomatous tumor, but when examining it with higher power, we find a number of spindle cells arranged in double rows, and between them a gelatinous substance something like the tissue of the umbilicus. I have also thought of their being gummata. Yet I doubt it, because there is no small cell infiltration around them, and perhaps it is a congenital tumor. Whatever I may find these tumors to be, they are extremely interesting to me, as I have never seen anything like them before, nor read of it.

TRACHOMA CELLS.

Under this microscope you see a trachoma specimen and will readily notice a number of large cells containing the bodies I consider to be parasitic and which may represent the organisms which cause this disease. The power is small, but still you can plainly see them, as I depicted them to you yesterday in my paper.

LAMELLAR CATARACT.

Under this microscope I have put the nucleus of a lamellar cataract. This case had been under my observation for about ten years, when the patient began to get so blind that she could no longer see to pour milk into her cup, although she could see sufficiently to get about with comfort. I extracted this lens with excellent result, as the patient's high-grade myopia rendered the wearing of a glass unnecessary.

RETRO-OCULAR ABSCESS.

DR. CASEY A. WOOD (Chicago).—The first case I present to you this evening has no features that are extremely unusual, and yet I present him as a problem, in order that I may get some advice as to further procedures. The first symptom which this patient manifested was that of unilateral neuralgia, apparently supra-orbital, which was very severe, lasting for many months. Patient was treated by different methods without any beneficial result. A short time before I saw him an abscess had formed immediately above the eye, and broken through in the situation which you see. You will notice here a fistulous opening. Following the breaking of the abscess he got some relief from the supra-orbital neuralgia. In examining the case carefully I found he had a nasal obstruction situated in the middle turbinal bone, which had been operated upon quite recently, and although this gave him some relief so far as the nasal symptoms were concerned, it has no special bearing upon the lesion under consideration. I made up my mind, from the fact that there was pain subsequent to the formation of the abscess beneath the supra-orbital region, the abscess bursting and giving relief to the symptoms, that I had to deal with empyema of the frontal sinus. Before I had seen him this sinus and the abscess behind had been treated by all sorts of solutions and powders, without avail. In this case I did, in a surgical way, what is recommended—namely, made an incision in the central line toward the crest of the nose, extending two inches, and at right angles to the brow. I peeled off the periosteum, and with a large trephine I entered the frontal sinus. Some pus flowed out, and I found a great deal of granulation tissue in the frontal sinus. This opening was kept open as long as it would remain so, and packed frequently with iodoform

gauze. In spite of all efforts, however, the opening finally healed very kindly. I may have to make a further opening if there be any further trouble with the frontal sinus.

Another case of retro-ocular abscess is now before us. In view of the fact that this patient has only one eye, I am a little tardy in doing certain things that I would feel like doing if he had two good eyes. I passed a large aneurysm needle through the sinus, deep behind the eye, and brought it out a little over half an inch towards the nose, made a counter-puncture, and inserted a large drainage tube. This was retained in place as long as possible, but healing apparently took place from the bottom, and we finally took out the drainage tube. The patient has still a little discharge from the opening, but not very much. His symptoms are entirely relieved, but still this leaking keeps up. It is not reasonable to expect that we should have in this case complete closure inside of three or four months.

It occurred to me that these cases would be interesting to you, and I should like to have some suggestions from any gentleman who has had any experience with such cases. In my opinion, there is no bony growth partially filling up the orbit on the inside.

MYOPIA.

Removal of the lens for high degree of myopia is not as common an operation in this country as it doubtless will be, and it is not as common as it is in Germany. I present to you this evening a case showing probably the first operation that was done in this country, so far as I know, for excessive myopia. I am pleased to present it, because it has been successful, the operation having been done some eight or nine years ago. I did some things then which, if I had to do it over again, I would, perhaps, be able to improve upon. This case was referred to in the discussion of Dr. Harlan's paper before the American Medical Association some years ago. The case was as follows: March 2, 1891, A. M., seamstress, aged 17 years. Has been myopic for eight years; is lately getting much worse. Could not go to school, and is now unable to do any sort of work. If she attempts to sew, her eyes ache and feel as if they were bulging out of her head. Glasses make objects brighter, but do not otherwise help. V., R. E., fingers at seven feet, with -14 D. $\frac{20}{c}$; V., L. E., fingers at eight feet, with -15 D.

$\frac{20}{LXX}$. There are sharp temporal crescents of about $\frac{1}{2}$ d. d. in both eyes. No choroiditis, although the choroidal vessels can be readily seen over the whole background. Macular regions show as cherry-red spots. March 3, needled the right lens—a small central opening. Used atropine and hot water to relieve subsequent pain. In a week, tension with pericorneal injection and pain. Made a corneal opening and removed most of the lens. Did two subsequent needlings. August 5, V., R. E., $\frac{20}{C}$. The pupil is irregular and attached to pupillary membrane. In December, needled left lens without mishap. The lens absorbed nicely, V., L. E., $\frac{20}{C}$. Did not order lenses for right eye, although with the correction on left side patient was able to read and do other near work and eyes were comfortable. I did not see her again until March of this year, when the following condition was observed: R. E., secondary cataract, fingers at 5'. Left membrane needled. Two weeks later, did a DeWecker's capsule scissors operation, after which patient obtained $\frac{20}{L}$ vision and could read J. 2 and do near work without trouble.

The improvement in this case has gone on, until now she has no trouble whatever with her eyes. She has no headaches or pains.

In connection with this case I wish to show another, which is a rather odd one, and I prefer to present it at this time. Here we have a case of monocular myopia of 13 D. The left eye is practically normal, but in the right eye we have a high degree of myopia. What are we going to do in such a case as this? Glasses have not been of any use at all. Partial corrections have been made and still she is practically unable to see.

No relief followed the wearing of glasses, there is no relief from non-operative interference. The fundus is practically normal, and there are no choroidal changes to speak of. The elongated axis on the right side can be seen very easily as the patient looks to the right. In operating on this patient all precautions were taken. You will see the central opening where I did the first needling. One should be very careful about first needling. I had trouble in the first case by excessive needling in that one-half of the lens came forward into the anterior chamber. This needling was done last Saturday, and there have been little shreds of the lens hanging forth in the anterior chamber. There has been very little reaction.

ANTERIOR SYNECHIA.

Anterior synechiæ, which form from penetrating wounds of the cornea, and other causes, are, as a rule, in this country left alone. They are not treated. I do not think this is a desirable thing to do in a certain class of cases, where it is possible to interfere successfully and easily, and I have brought this patient here this evening to show my usual procedure in such cases. In cases in which there is a space between the anterior synechia and the margin of the cornea in the anterior chamber, I have for a number of years been in the habit of cutting the synechia close to the cornea by means of Lang's knives. These are two knives, one a blunt-pointed bistoury, and the other a sharp-pointed bistoury. The sharp-pointed bistoury is entered very much as the Graefe knife, and when withdrawn no aqueous is lost. This instrument can be used very skillfully after a little practice. Through the opening in the cornea, the blunt-pointed bistoury is brought into the anterior chamber, passed around the synechia, and it then is quite an easy matter to cut it off. The operation is simple, and because of its simplicity, I do not think anterior synechiæ ought to be left alone. In this case the penetrating wound of the cornea tore a portion of the iris, so that there was an opening through the mass of the iris itself, and quite a large portion of the torn piece presented through the cornea. Having dealt with the case in the manner described, no reaction whatever followed, and the present state of the case is certainly much better than if I had left the anterior synechia untouched. When the traumatic cataract is absorbed, as it is being absorbed, he will have a pretty fair eye, without danger from infection and pulling on the iris.

OPERATION FOR PARTIAL ADVANCEMENT.

I wish to present a new operation for partial advancement. It is so simple and effective that I do not hesitate to say that one may do it and allow the patient to go about his or her ordinary occupation. It is really not entirely original, because my friend, Dr. Beard, did the same thing some time ago; but the technique is the important thing in the simpler operations with one stitch, and I present this patient as showing the results after the operation, which was done four weeks ago. The operation was done on the external rectus. The patient had

marked esotropia, and I passed the needle through the insertion as near to the cornea as I could get, paying no attention to the conjunctiva. Indeed, I do not think the conjunctiva should receive any attention, and in cases of this kind we can assume that it does not exist. I passed a thread in here (illustrating), using a strong suture of black silk, and proceeded to push it in through the conjunctiva below, and then worked it in and out so as to make a purse-string operation, and in tying drawing the tendon and conjunctiva and everything together. In this case there was no section of the tendon. Four weeks ago the eye presented a bad appearance after having had this done, but at present you will notice that the result is excellent, the swelling having all disappeared.

DISCUSSION.

DR. C. D. WESCOTT.—I would like to ask Dr. Wood whether he has ever been able to use these little knives in cases where there was complete occlusion of the pupil.

DR. WOOD.—I never have. I have seen Lang do it, and it can be done.

DR. W. F. COLEMAN.—I would like to ask Dr. Wood how much esotropia there was in his case.

DR. WOOD.—I can not say. I do not think it is a relevant question. The whole thing is entirely an empirical procedure on my part.

DR. COLEMAN.—How much esotropia would you expect to correct?

DR. WOOD.—I would do the operation in almost all cases where you would not do section and advancement at the same time, where you possibly hope to get some results from advancement alone.

DR. A. ALT.—How long do you leave the suture in?

DR. WOOD.—In this particular case I left the suture in ten days.

DR. J. E. COLBURN.—Some years ago, at the Cincinnati meeting of the American Medical Association, I reported an operation similar to this, and devised a double hook for raising the muscle, being sure that I had the muscle in grasp while I was making the operation, as the Doctor has done. I think I have the hook in my museum. I have made a few such operations, and have obtained good results, but the reaction was so

great in some of the cases, and the recovery so slow, that I made up my mind that advancement with section was the preferable procedure, and I never went further than to call attention to the operation at that time.

DR. J. O. STILLSON (Indianapolis, Ind.).—I saw Dr. Jackson make an operation, similar to the one described, last fall in Philadelphia, the case having been presented to the Philadelphia Medical Society. I should like to give briefly Dr. Jackson's idea about the technique of needling. Dr. Jackson passes the needle not far from the pupil into the cornea, instead of in the periphery of the cornea, which allows the aqueous to escape. This, in turn, allows the lens to come forward, and he uses the cornea as a fulcrum, and without enlarging the opening in the capsule, he makes extensive trituration of the lens inside the opening which he has made in the capsule, and which he intends to leave small. After triturating the lens well he withdraws the needle, and in this way he gets more rapid absorption without the risk of allowing the soft lenticular substance to come out into the anterior chamber. The aqueous is secreted very soon, and the anterior chamber is re-established, so that he does not get, as he claims, any great amount of irritation or reaction. The results of this and other operations were very gratifying.

DR. CHARLES H. BEARD (Chicago).—I would like to ask Dr Wood his method of needling. The method I have pursued of late years has been always with a small Graefe knife, not with a needle, entered near the sclero-corneal junction. In making our first needling, Dr. Wood is quite right in saying that we should not attempt to do too much, merely prick the anterior capsule. The Graefe knife is of great advantage over the needle, from the fact that we can make a slanting incision, barely lifting up the capsule with the point of the knife, and quickly withdrawing it. Afterwards, when it comes to another needling, we can enter more boldly, and insert the knife deeply into the lens substance. Certainly the old method of needling by means of Bowman's needle plunged through the cornea, is a very dangerous procedure. I would do this operation with more fear and trembling than to make a cataract extraction. I have seen serious results from needling by Bowman's needle, because by so doing little shreds of the capsule are easily drawn out into the small opening made by the needle, which serve as

foci of infection. Whereas, an incision made near the periphery of the cornea with the Graefe knife will heal immediately, and there is no risk of drawing shreds into it.

DR. DAVID W. STEVENSON (Richmond, Ind.).—I have done about a dozen of these needling operations for myopia. I remember doing the operation on a patient in China. The man absolutely stumbled over everything, and he had about 18 D. M. After the operation he became a useful man. I did not have any bad results from any of the operations I have done. A large number of Chinese people are short-sighted because their print is so bad, and oculists who wish to do this operation can have many opportunities of doing it in China. I think the operation is really one that can be done safely by a skillful surgeon in Chicago as well as in China, and I have no doubt there are cases here suitable for the operation. Frequently, I use a suction apparatus or a common, ordinary small tube to hasten the matter somewhat, and thus with the tube suck out a large part of the lens after needling.

DR. A. ALT (St Louis).—I have also performed a larger number of these myopia operations, and then taken occasion to place one or two cases on record. In one case I operated on both eyes in a man who was utterly unable to do any near work even with correcting glasses. He had myopia and myopic astigmatism, and dislocation of the lenses downward. The first eye I operated upon turned out beautifully, so that the man had normal vision, and his astigmatism disappeared after the operation and he read with a +2.75 D. With this comparatively light spherical lens he could do all near work. He had previously been unable to go to school on account of the condition of his eyes, and he had no education to speak of, but was eager to get one. With this one eye vision was so good that he went to a business school and has been carrying on his business for four years. About nine months after the first operation, he came back and asked me to operate on the other eye which, however was lost from detachment of the retina.

DR. E. A. KEGLEY (Cedar Rapids, Iowa).—A young man, aged 23 years, came to me wearing a 16 D. myopic glass. He had been trimming Osage orange, and had been injured in the eyes by one of the thorns, with the lens becoming opaque. I needled it three times, and within six months he began to pursue his studies in college without the use of any glasses.

DR. WOOD.—I quite agree with the remarks of the various gentlemen regarding needling, as I do not think it is such a simple operation as it is usually considered to be. It is considered simple until some one gets a serious reaction from it. I prefer to use a needle in this operation, which closely resembles a small Graefe knife. It is very important in this operation not to trifle too much with the lens, and the lesson which I received in my first case is one that I have never forgotten. The first needling should be done in a quiet sort of way, with a sharp knife or a sharp needle.

A CASE OF OPTIC ATROPHY FOLLOWING INJURY MUCH IMPROVED.

DR. W. F. COLEMAN (Chicago).—Mr. B, aged 61 years, was struck by a piece of scantling, 45 pounds in weight, on the forehead in August, 1896, rendering him unconscious for ten minutes. He resumed work in a week, but felt a sense of intoxication in his head. Two weeks later, he fell from a wagon and struck the back of his head, but was not rendered unconscious. He is the father of thirteen children, ten of whom are living. His wife had one miscarriage from overlifting.

He gives no history of syphilis or other disease; has had no cerebral or spinal symptoms. Smokes three pipesful of tobacco a day since 18 years old; takes one glass of liquor a day.

The field of vision, taken four months after treatment began, showed concentric contraction for each eye of 10° in the whole field. Color vision: The right eye confuses purple with grey and grey with blue; the left eye confuses purple and green with grey and grey with blue.

Before treatment, vision, R. E.=fingers at 12 feet slowly; L. E.=same. Fundi showed advanced optic atrophy on the temporal side of both discs. The choroidal pigment was thinned on the temporal side of each disc. The retinal vessels appeared normal.

He was treated for three months at the Illinois Eye and Ear Infirmary with strychnine injections and internal medication, but vision continued to fail. The diagnosis, as told the patient, was optic atrophy. Prognosis unfavorable. For a month previously was treated at the Hahnemann Hospital. Diagnosis and prognosis the same.

The patient had been treated at my clinic at the Post-Graduate Hospital by my assistant, Dr. Pattillo. Galvanism has been used for five minutes daily, the cathode to the closed lids of each eye, and the anode to the nape of the neck with a current of 5 m. a.

After four months treatment, vision, each eye= $\frac{6}{xviii}$, with $+4.50^\circ$ each eye Sn. .05 at 1 to 14 inches. Fundi, the discs show much more color than at the first examination.

DISCUSSION.

DR. YOUNG (Burlington, Iowa).—I think it would be well for the members of the Association to examine the eyes of Dr. Coleman's patient. Personally, I fail to see on what basis a diagnosis of optic atrophy has been made, inasmuch as there is no appreciable diminution in the caliber of the blood vessels, and I do not see any cupping. Furthermore, the field does not indicate any atrophic condition.

BILATERAL ABDUCENS PARALYSIS.

DR. WM. A. FISHER (Chicago).—I present this case of bilateral paralysis, not as a common one, but as one of most infrequent occurrence. Here we have not only paralysis of both abducens, but as much contraction as is possible, not only of the muscles that turn the eye inward, but of all the ocular tissues toward the nasal side. I would hesitate to present to this Association an ordinary case of unilateral abducens paralysis, for you all know how frequently they occur. In fact, I am rarely without such a case. At the present time I have three cases in my clinics, all giving a specific history. This case shows what a great deformity can follow a paralysis of this kind.

The history of this case is as follows: Mrs. B., aged 50 years, married thirty years; has had five children, three living and in good health; one died of measles and one of croup. Father died at the age of 70, mother died at the age of 75.

She had three brothers, one died in the army in India; has not heard from the other two for ten years, when they were in good health. Six sisters, two died in infancy, others in perfect health.

Thirty-seven years ago, or when she was 13 years of age, her left eye began to turn in. Previous to that time she was

not aware of having any eye trouble. She consulted a physician in Ireland and was told her eye could be straightened by an operation. About twenty years ago, or seventeen years after the left eye turned in, her right eye began to turn. Six years ago she had la grippe, and since that time her eyes have grown rapidly worse. The last two years they have been about as we now find them. The patient has been a hard-working woman all her life, doing washing and carrying heavy baskets of clothes on her head. She is now in, and has always enjoyed, good health. Vision sufficient to enable her to get around where she is well acquainted. Tension normal. The eyes are rotated so far inward that both pupils are hidden in the inner canthi. It was impossible to rotate either eye out under cocaine anæsthesia. Not being able to get an ophthalmoscopic view, and knowing there could be no harm in an attempt toward straightening, and possibly some good result, the patient was anæsthetized with chloroform, and an effort was made to rotate the the right eye out, and sever the offending tissues. It was impossible to rotate the eye outward to any extent, but an attempt was made to sever the internal rectus. Not only was it necessary to sever the muscles that rotate the eye inward, but it amounted to a dissection of all the ocular tissues toward the nasal side. The eye was fixed as firmly as in a case of panophthalmitis, and adhesions everywhere. A slight improvement was produced which lasted a few days; the pupil was free from the inner canthus, but no improvement in vision. As you see the case now, contraction has taken place and the eye is in about the same condition as I found it. The patient has never complained of pain in the eyes and gives no history of any inflammatory condition, but we have adhesions that could not have been produced by inflammation and the patient remained unconscious of it.

Hutchinson reports seventeen very interesting cases of ophthalmoplegia externa (Royal Medical and Chirurgical Society of London, 1879). In summing up his report it seemed certain that syphilis was the cause in ten of the seventeen; that in the remaining seven a reasonable suspicion of syphilis might be entertained in several. He further says, with such a fact in mind one feels that it is almost impossible to make the negative even fairly possible. The evidence which connects this affection with syphilis is exceedingly strong, and that which

favors the belief that it can occur independently of it must be held to be open to some doubt. The cause of paralysis in this case is obscure. We can exclude some of the common causes, but syphilis should not be excluded, even if we have, as we do in this case, a negative history. As syphilis is given as the cause of nearly all these paralyzes, I have given her increasing doses of potassium iodide, and will continue for a reasonable time. It would be no more than fair to suppose the lesion in this case was directly caused by la grippe.

DISCUSSION.

DR. A. R. AMOS (Des Moines, Iowa). — Dr. Fisher, in presenting his case, assumes that paralysis of the abducens is the primary cause of the position of these eyes. I do not think this assumption is necessary. It seems that we must account for it rather on the basis of contraction in the fibrous tissue of that region, and I think it would be proper to assume it as the cause of the position of the eyes as they are situated now. The slight ptosis which is present might be present with this condition at the same time. The external recti are paralyzed from long-continued stretching, and with the weakness incidental to the paralysis the eyeballs drop forward. It is a process not unlike that which takes place in chronic diseases elsewhere in fibrous connective tissue, and it appears to me that this case is one of that character.

DR. FISHER.—I have nothing particular to add regarding the possible diagnosis of paralysis of the abducens except as I find it. At first, I thought the case was one of complete ophthalmoplegia externa, in that I found slight movement upwards and downwards, and it is impossible to tell what has caused the contraction. I reported the case as I have found it. It is certainly a paralysis, whether caused by pulling the eyeballs inward, or whether it started from the opponent muscle.

[TO BE CONCLUDED.]

OPHTHALMOLOGICAL SOCIETY OF THE UNITED
KINGDOM.

H. H. SWANZY, FR.C.S.I., President, in the Chair.

THURSDAY, JUNE 9, 1898.

A Case of Retinitis Proliferans.—MR. PERCY FLEMMING read this paper. The specimen was obtained from a man aged 22 years, who died from chronic renal disease. The following appearances were seen on section: The posterior part of the retina was much thickened, folded, and detached; a thin membrane stretched across the vitreous cavity from the ora serrata to the posterior part of the retina; another membrane had a similar origin in part, but ended freely about the middle of the vitreous cavity; the space between these membranes and the retina was occupied by blood clot; there were signs of cyclitis. The chief microscopic appearances were: A thickening of the retina and disorganization of its inner layers, a definite transformation of the clot (as seen in successive sections) into connective tissue membrane with lacunar spaces, and a pulled-out condition of the retina near the ora serrata, resulting in elongation and rupture of Müller's fibers. It was possible to trace a direct continuity between the membranes and the retinal tissue. A review of previously recorded cases was given, and the suggestion made that the essential factors of the disease were: (1) Hæmorrhage, and (2) an inflammation of the sustentacular tissue of the retina allied to sclerosis of the central nervous system.

Remarks were made by MR. WRAY.

Œdema of the Conjunctiva, Due to Obstruction of the Lymph Stream.—MR. HOLMES SPICER said these cases presented themselves in two groups—the acute and chronic. In the acute cases, owing to a poison received into the conjunctival sac, supposed in one case to have come from wood pavement, the preauricular and cervical lymphatic glands became

inflamed, although the local signs of conjunctival irritation were not marked. The flow of lymph was hindered, and a condition of extreme œdema of the conjunctiva was produced, in which the conjunctiva hung out from between the closed lids as a flaccid gelatinous bag. Two cases were narrated in which the glandular enlargement was increased by the simultaneous occurrence of follicular tonsillitis. In the second chronic group, owing to a suppurative inflammation of the lymphatic glands of one side of the face and neck, great cicatrization had been produced, the lymph stream was hindered, the sub-conjunctival tissue spaces became filled with the solid constituents of the lymph, and a condition of solid œdema resembling elephantiasis in other parts remained, which was persistent in spite of treatment.

MR. BATTEN described some cases which he thought might be explained in a similar way.

MR. BASS thought the follicular tonsillitis might have been the original source of infection in the two acute cases narrated.

The Pathogenesis of Anterior Polar Cataract. — MR. TREACHER COLLINS first described a case in which a melanotic sarcoma of the anterior part of the ciliary body, coming in contact with the antero-lateral part of the lens had produced an opacity of the lens in that position, which presented precisely similar microscopical appearances to those seen in anterior polar cataracts. This, he thought, strongly supported the view that these latter resulted from contact of lens and cornea arresting the osmosis of nutritional fluids to the lens. He next demonstrated the microscopical characters of a congenital cataract where there was a large anterior polar opacity, beneath which the lens fibers had undergone such extensive degeneration that the whole lens was much flattened from before backwards. He thought the changes could be accounted for by prolonged contact of the lens and cornea in foetal life, after the anterior fibro-vascular sheath of the lens had disappeared. He then quoted several cases in which, besides an anterior polar opacity, there was a second opacity situated beneath it a little depth in the lens. In all these the cataract had been formed in early life, and several years had elapsed before the patient came under observation. He showed a drawing of the micro-

scopical appearances of a lens presenting two such opacities. There was the usual laminated mass at the anterior pole, then some normal lens fibers, and then an area where the lens fibers had broken up into irregular amorphous granules and detritus. This area corresponded fairly accurately in shape to that of the mass at the anterior pole, and he thought there could be no doubt that they were at one time in contact, having become separated by the gradual growth of new lens fibers inwards between them.

Splinters of Steel Removed From the Eye With the Electro-Magnet.—MR. SNELL related two cases: (1) From the retina with preservation of excellent sight. The piece was observed with the ophthalmoscope as fixed in the retina in the outer and lower quadrant; the fragment had passed through the cornea close to the sclero-corneal junction, and when the patient was first seen four days after the accident, the glistening of the steel was distinct, but the foreign body was partially covered with exudation. V.=fingers. The electro-magnet was inserted eight days after the accident between the inferior and internal recti, and the fragment removed. Later V.=²⁰/_{XXIV}.

(2) From the vitreous, the foreign body being localized by the *x*-rays. The patient was not seen for several weeks after the accident. The foreign body diagnosed as having entered upper part of cornea, passing through lens into vitreous. Dr. Mackenzie Davidson used the *x*-rays, and localized the splinter in the upper part of the vitreous; a skiagraph showed it to be needle-shaped, measuring 8 mm. in length, and placed obliquely. The electro-magnet (fifteen weeks after the accident) was introduced through a scleral incision between the inferior and internal recti, and the splinter at once removed—V.=fingers.

MR. TATHAM THOMPSON spoke of the difficulty sometimes experienced in withdrawing the foreign body through a small wound which he had overcome by approaching the body from another direction so as to get it end on. He thought one of the chief advantages in using the *x*-rays was the power of excluding foreign bodies in doubtful cases.

MR. LANG described two cases in which foreign bodies had been located by *x*-rays in the eyeball.

Large Fibroma of Upper Eyelid.—MR. SIMEON SNELL related this case. The patient, a man, aged 43 years, never remembered being without the tumor, and it had only increased in size very slowly. At the time of his being first seen it was pedunculated, the size of a filbert, and by its weight and situation interfered with the movements of the eyelid and with vision. It was attached to the left upper eyelid just external to the punctum. It was dissected off. The tumor was white and glistening in section, and under the microscope it was found to consist of fibrous tissue.

Toxic Amblyopia.—MR. ANDERSON CRITCHETT showed a case of toxic amblyopia which was attributed to poisoning by iodoform. An elderly lady suffering from an extensive cancerous ulceration of her breast had been in the habit of applying iodoform to the ulcer over a period of three years. She developed somewhat suddenly extreme amblyopia, lost the recognition of all colors except blue, for which she had a large central scotoma, and was found to have slight pallor of the outer half of each optic disc and a small granular change to the inner side of each macula lutea. Since the iodoform had been stopped (ten weeks) the return of her color vision had been very decided, she could recognize any color by indirect vision, but still had a large central scotoma. Her visual acuity was still very bad, though it had shown some improvement.

Card Specimens.—The following were the card specimens:
 MR. HARTRIDGE: Phagedæna of the Eyelids.
 MR. WRAY: (1) Pemphigus of the Conjunctiva; (2) Skia-gram of a Foreign Body in an Eye.
 MR. TATHAM THOMPSON: Intraocular Granuloma.

BOOKS AND PAMPHLETS.

GLAUCOMA; ITS SYMPTOMS, VARIETIES, PATHOLOGY AND TREATMENT. By ALEX. W. STIRLING, M.D. With illustrations from micro-photographs. 1898. St. Louis: Jones H. Parker. Price, \$1.50.

A series of comprehensive lectures on glaucoma, which the author had delivered to the students of the New York Post-Graduate School, and which have seriatim appeared before in the *Annals of Ophthalmology*. We recommend this book to our readers as it gives a fairly good representation of most that is known about glaucoma and of the theories advanced to explain the different symptoms of this disease. The sections used for illustration leave much to wish for.

SYSTEM OF DISEASES OF THE EYE. Edited by W. F. NORRIS, A.M., M.D., and CH. A. OLIVER, A.M., M.D. Vol. III, Local Diseases, Glaucoma, Wounds and Injuries, Operations. 1898. Philadelphia: J. P. Lippincott Co.

This, the third volume of this collective work, is, like its predecessors, of a high excellence. While not wanting to detract from any of the other articles, we want particularly to call attention to the one on "Eye Operations," by our foremost living eye surgeon, Dr. H. Knapp. Many and excellent illustrations accompany the different articles and enhance their value.

ALT.

PAMPHLETS RECEIVED.

"Neurotic Eczema," by L. D. Bulkley, M.D.

"Abdominal and Pelvic Surgery," Wm. H. Wathen, M.D.

"The Technique of the Mastoid Operation," by E. B. Dench, M.D.

"Three Years of Serum-Therapy in Tuberculosis," by J. R. Lemen, M.D.

"The Pharmacology and Therapeutics of Kryofine," by G. F. Butler, M.D.

"A Clinical Study of Kryofine," by S. V. Haas, M.D., and J. B. Morrison, M.D.

"Report of Five Cases of Abscess in the Brain in Infants, etc.," by L. E. Holt, M.D.

"Inequality of the Pupils Observed at an Altitude of 10,250 Feet," by E. T. Boyd, M.D.

"Kryofine—Observations Made at the Clinic of Professor Eichhorst at Zürich," by Eugenia Back.

"A Case of Bilateral Syphilitic Ulceration of the Palpebral Conjunctiva," by C. A. Veasey, M.D.

"Partial Report of Eight Hundred Cases of Labor," by H. S. Crossen, M.D.

"Vaginal Hysterectomy for Prolapsus," by H. S. Crossen, M.D.

"A Rapid Treatment of Chancroid and Ulcerative Syphilitic Lesions," by A. H. Ohmann-Dumesnil, M.D.

THE AMERICAN JOURNAL OF
OPHTHALMOLOGY.

VOL. XV. SEPTEMBER, 1898. NO. 9.

ORIGINAL ARTICLES.

THE SURGICAL TREATMENT OF KERATOCONUS.¹

BY ROBERT SATTLER, M.D., CINCINNATI, OHIO.

SOME years ago I began a study of this congenital deformity of the cornea, together with a search of the best surgical intervention for those cases of double keratoconus in which all other methods of treatment as well as optical aid, afforded unsatisfactory or no relief. In the selection of cases, care was exercised to include only typical examples of this uncommon affection, in which there was little or no question concerning the congenital origin.

Those cases in which this was in doubt, or if it could be assumed that antecedent disease of the cornea, conjunctiva or other structures had existed, were excluded.

I soon shared in the common experience that the various and vaunted methods of treatment and relief other than surgical were found wanting. Relief, such as could be afforded, was brought about mainly through the aid of corrective lenses, with or without stenopæic appliances. This led to a more careful study of the various surgical methods. Before offering conclusions gained from the clinical study of eleven cases and surgical experience in five of this number, it must be affirmed that surgical intervention was advised and practiced only as a last necessary resort.

¹Synopsis of paper read before the American Ophthalmological Society, July, 1898.

Keratoconus is, like the higher degrees of myopia and keratoglobus, a congenital deformity. It affects the central region of the cornea and in most instances both eyes.

It may remain stationary for life. In a certain proportion of cases there occurs a tendency to progressive increase of this conical deformity. In some instances this is arrested spontaneously and leaves the patient a fraction of available vision. In others it continues until the eyes for all practical purposes are useless. This last and smaller contingent is the one for which surgical treatment may become a justifiable and necessary venture.

This tendency to progression develops in most instances between the twelfth and twenty-fourth year; although exceptionally it may occur as late as the thirtieth year.

Sex appears to play a significant rôle; of eleven cases under observation only two were males.

A disturbed state of the general health and nutrition appears if it is present, to be rather a complication than a direct cause for this mysterious advance of the deformity which is observed in some cases. But without assuming latent local causes which antedate the general ones, the former can not be held responsible; that they influence unfavorably a progression once begun is certain.

It differs from congenital myopia, buphthalmus, keratoglobus, in that the internal structures even during the period of progression are not implicated; in fact, the opposite statement is upheld by the cases under my observation, that these structures remain healthy and complications such as occur in keratoglobus and myopia, unless the conical state of the cornea is associated with the latter, are not met with.

Clinically, it resembles most keratoglobus, but distinctive differences separate it from this even more unfortunate malformation. Keratoglobus is recognized more readily because of the more striking deformity, and it is also in most instances associated with abnormal dimensions of the globe, thinness and discoloration of the sclera. Later it becomes even more conspicuous on account of pathological changes which invade such eyes and terminate in optic nerve atrophy and excavation, glaucoma, hydrophthalmus, etc. Complaints due to defective and disordered sight and statements reciting ineffectual attempts to secure better vision through the aid of lenses oc-

cur generally before the tenth year, and the graver complications of glaucoma, optic nerve atrophy, etc., after the thirtieth year. With keratoconus this is different. The real malformation of the cornea is often not recognized before the tenth year, and in some cases it is discovered only after unmistakable progression with increasing failure of sight have come about. It is during the period following puberty or before the twenty-fourth year that this comes about. During this time functional distress of the eyes may be pronounced and persistent, but serious complications of the optic nerve and glaucoma such as happen in the allied affections of keratoglobus, etc., are not observed.

The surgical treatment of keratoconus to secure an arrest of the increasing deformity and for the possible betterment of sight, is, in every instance in which it can be considered, a justifiable intervention, but beset with dangers and difficulties.

It is always a tedious undertaking. My experience included either a partial abscision of the prominent cone, the excision of narrow wedge-shaped pieces of tissue from its apex, or the placing of a number of intersecting linear excisions of tissue, through this prominent region without penetrating the thickness of the cornea.

After subsequent cicatrization, this region, which it was hoped had gained tissue firmness and resistance, was tattooed.

An iridectomy preceded, in all my operations except one, the interference undertaken to reduce by cicatricial contraction the ectasia of the central region of the cornea.

In one case I found it expedient to supplement the operations on the cornea and iris by the removal of the lens, as the case was complicated with excessive myopia.

Cauterization of the apex with actual or galvano-cautery, even with every precaution that it be superficial, I found fraught with greater risks and dangers.

Tapping of the anterior chamber in order to secure a firmer contraction at the seat of excision is, in my opinion, an unwise supplementary procedure. That greater dangers attend surgical interference in this region is probably due mainly to the extreme vulnerability of the central region of the cornea to traumatism of every kind and degree.

In a deformed or conical cornea with its nutrition precarious in consequence of its greater thinness and distortion of its

tissue, this danger appears increased and even that inflicted by the simplest surgical procedure is violently resented.

Operative interference should not be resorted to in one eye which is hopelessly defective if the fellow eye still retains $V.=0.2$ or 0.3 , even if it can be established that the deformity in the best eye is slowly progressive.

It is only when vision is reduced in both eyes to less than 0.1 and lenses and stenopæic appliances are discarded as useless and the patient helpless in consequence of the blindness, that it should be advised or practiced.

CASE I.—In this patient, a young woman, Miss Eloise K., aged 19 years, useful vision was restored in both eyes. Until surgical interference was resorted to, she was helpless and her sight reduced to $\frac{5}{\infty}$ in the right eye and $\frac{6}{\infty}$ in the left eye. Formerly lenses had afforded better vision, but these as well as stenopæic devices became useless and were discarded. She had been under my observation for two years, and during this time every available method of treatment—general, local, eserine, compress bandage, absolute rest, repeated adjustment of lenses, stenopæic appliances, were faithfully tried, only to be abandoned as useless. The history conclusively upheld the congenital origin. At the age of 12, lenses were given her, which brought the sight of her best eye (left) to 0.4 and right to 0.3 . She was enabled with much difficulty to complete her education. During the last two years, however, vision commenced to fail rapidly, and with a visible increase in the pellucid staphyloma in both eyes. The only complaint was the confusion which light produced, nor was there any evidence on the part of the internal structures which might suggest any other disturbance except the visible one of progressive increase of the central ectatic area of the cornea. The patient's health about this time showed evidences of a serious breakdown; she was anæmic and it was feared that a tubercular tendency was about to manifest itself. A change of locality brought with it no improvement in the general health, but she returned for advice more concerned than ever about the increasing failure of sight. She was no longer able to read the largest type, and she could not move about without an attendant. There was also a marked increase of the pellucid ectasia of the cornea. In spite of the disturbed state of her health, surgical interference was advised as an imperative necessity.

The most imperfect, right eye, was selected and a small iridectomy performed downwards and inwards; after an interval of several weeks, abscision of the prominent apex of the conical protuberance of the cornea without penetrating the thickness, was performed. Subsequently this region was tattooed.

One year afterwards, vision with corrective lenses was 0.4. A decided improvement having taken place in her general health, the left eye was prepared for operation. The only modification being that the apex was not abscised, but instead a small wedge-shaped piece of cornea was excised horizontally and a similar piece at right angles to it vertically. The anterior chamber was not opened. This eye resented the traumatism inflicted by the operator, and for several months remained irritable, and it was necessary to defer tattooing until fourteen months after the operation.

The final outcome of this case was satisfactory. The patient was examined recently, almost fourteen years after the first operation, and vision was found with corrective lenses to be 0.6 in the right, which had always been her most defective eye, and 0.4 in the left. She has been able, during the last few years, to read and use her eyes with comfort and without much fatigue.

In contrast to the favorable outcome of this case, I mention briefly my last experience with the surgical treatment of keratoconus.

Miss S., aged 20 years, Bellefontaine Ohio, consulted me first about four years ago. She was in excellent health. She had never enjoyed perfect vision, either for distance or close range. She was, in common with other members of her family, considered short sighted, and had worn glasses, but as she herself stated, had never derived from their use the benefit she expected and should have. I found what others had discovered before me, well-marked conical deformity of the cornea, occupying the central and adjacent regions in both eyes. In her most defective eye (right) vision was 0.1, but little or not at all benefited by lenses. The vision of the left eye was 0.3. She could, with this eye, read ordinary print, but every prolonged effort was attended with annoyance. In every other respect both eyes were found healthy.

The rapid decline of vision in both eyes and imperfect aid from lenses in her best eye, and the practically hopeless state

of the right one, led me to suggest an attempt to improve this hopelessly defective eye.

The operation proposed consisted of the placing of a series of intersecting linear excisions of tissue through the prominent area of the cornea, followed later by a small iridectomy and tattooage of the corneal scars. In order to test the susceptibility of the cornea to traumatism, I determined, as an exploratory venture, to excise a single narrow strip of tissue, just above the center, which appeared most prominent, parallel to the horizontal diameter of the prominent cone. The anterior chamber was then opened through the wound made. For forty-eight hours the eyes remained bandaged, only the outer dressing was removed and there was no complaint whatever. After this, or on the third day, there was precipitated with incredible rapidity and intensity a reaction which foreshadowed only the hopeless ruin of the eye. Complete sphacelation of the cornea was followed by panophthalmitis and orbital abscess. She opposed enucleation at first, but finally consented, and the eye, filled and surrounded by pus, was removed, only to be followed by cicatricial contractions in the cavity of the orbit.

This was certainly an unhappy termination and depressing disappointment. Every possible caution had been exercised, the operations performed with the least traumatism possible, amidst the most favorable surroundings and the most stringent asepsis. Cocaine was instilled but once. The patient was in excellent health; in fact, everything appeared as favorable as could be wished or desired.

SOCIETY PROCEEDINGS.

THIRD ANNUAL MEETING OF THE WESTERN OPHTHALMOLOGICAL, OTOLOGICAL, LARYN- GOLOGICAL AND RHINOLOGICAL ASSOCIATION.

[CONTINUED.]

A PECULIAR CASE OF PARALYSIS OF THE OCULAR MUSCLES.

DR. THOMAS FAITH (Chicago).—John N., bricklayer, aged 51 years, unmarried, nationality, Belgian. Family history, had four brothers and one sister. First child, boy, living; second child, boy, died in infancy; third child, patient; fourth child, boy, still born; fifth child, girl, died at the age of 5 years of cholera; sixth child, boy, died at the age of 2 years of convulsions. Father died at the age of 33 years of cholera. Mother died at the age of 66 years suddenly, cause unknown.

Previous history, when 9 years old, patient had epidemic dysentery; malaria at the age of 30. He had gonorrhœa at the age of 14; has had enlarged glands in the groin at times. Indefinite history of some skin trouble which occurred several times, but disappeared always on taking a brisk cathartic. Had a sunstroke in 1894, which has incapacitated him for hard work, particularly in warm weather.

History of eye trouble, has central leucoma of both corneæ, which has been present since the patient can remember. Has had a tendency to divergence in the right eye for the last seven or eight years, which has grown gradually more marked since 1894, the time of the sunstroke, up to 1896, since which time it has remained stationary. Patient has some evidence of having had syphilis—namely, some cervical adenitis, and what appears to be the remains of a mucous patch in the mouth.

Present condition, is, as you can see, paralysis of the internal rectus, superior rectus, inferior rectus, and superior oblique of the right eye. The eye remains, when at rest, in a position of divergence. If directed to look to the left the eye

can only be brought inward as far as the median line. Comparing it with its fellow of the opposite side and directing the patient to look downward, it is seen to fall behind. The same is true when he is directed to look down and to the right, but when he is directed to look up, instead of the eye moving directly upward, it moves up and to the right, which is easily done when the patient is directed to look in that direction, showing that the inferior oblique and external rectus are the only muscles which are acting.

The lesion causing the paralysis in this case is difficult, if not impossible to locate. In reviewing the nerve supply of the affected muscles we find the origin of the third nerve is apparently from the inner surface of the crus cerebri, and immediately in front of the pons Varolii. The deep origin is traced to a nucleus on each side of the median line in the floor of the aqueduct of Sylvius, beneath the corpora quadragemina. This nerve pierces the dura mater below the posterior clinoid process, passes along the outer wall of the cavernous sinus and divides into two branches which enter the orbit through the sphenoidal fissure between the two heads of the external rectus muscle. The superior division supplies the superior rectus and levator palpebræ, the inferior division divides into three branches—one goes to the internal rectus, the second to the inferior rectus, and the third and largest of the three, to the inferior oblique. This also sends a branch to the ophthalmic ganglion, forming its motor root. The branches of distribution of the ganglion or the short ciliary nerves supply the ciliary muscle and iris.

The fourth nerve, which supplies the superior oblique muscle, arises from a nucleus in the floor of the aqueduct of Sylvius below the origin of the third nerve. It pierces the dura near the posterior clinoid process, passes along the third nerve and enters the orbit through the sphenoidal fissure, and is the highest of the nerves passing through the orbit.

In the case under consideration we have the fourth nerve involved, the branch of the superior division of the third, which supplies the superior rectus, and the branches of the inferior division, which supply the internal and inferior recti, the third branch, or that going to the inferior oblique and ophthalmic ganglion, being unaffected. It does not seem probably for it to be a central lesion, from the fact that we have no paralysis

the inferior oblique, no paralysis of accommodation, no dilatation of the pupil and no ptosis, though Meyer states that if the cause is situated in the central parts or near the origin of the nerve, the disease must be very extensive to involve all the fibers of the nerve, and paralysis of the fourth being present in the case favors the theory of central origin.

The case in hand may be one of beginning chronic ophthalmoplegia, which is characterized by a loss of power in one or more eye muscles, which gradually increases and involves other muscles until it may be that every muscle is paralyzed. This disease may be either symmetrical or unilateral; nor are all the muscles always paralyzed. Double vision is present early, but later disappears. The levators may be partially paralyzed or wholly unaffected. The disease is essentially chronic and may last for years. If the intra-ocular muscles escape it is considered by some as strong evidence that the trouble is nuclear, but according to Mauthner, it is not a characteristic sign. Siemerling concludes that nuclear disease may be inferred from external ophthalmoplegia. Chronic ophthalmoplegia may be congenital, hereditary, may occur with constitutional syphilis, and may follow injuries. It is often associated with other affections of the nervous system, especially locomotor ataxia and progressive paralysis of the insane, and is more common in males than in females.

The above points would tend to indicate that this case is one of chronic ophthalmoplegia of central origin, though the lesion may be a peripheral one, and I have thought of the possibility of it being due to some periosteal inflammation, growth or gumma along the inner wall of the orbit, near the apex, and causing pressure upon or involving the four muscles which pass nearer to the inner than to any other wall of the orbit, and are the muscles which are here involved. Whatever may be the location of the lesion the paralysis is surely a peculiar one, and is probably due to syphilis, as I think I have obtained some benefit from the use of iodides.

DISCUSSION.

DR. ROBERT TILLEY (Chicago).—This man informs us that he was perfectly well before he sustained two accidents, one in the front of the head and one on the back part of the head.

The injury in the back part of the head, as he describes it, seems to be situated in what is supposed to be the cortical region for vision, and there is a marked depression in the skull. It is always interesting to try and find out, if possible, something regarding these injuries. I have seen so many cases where atrophy of the optic nerve has followed injuries about the head. I recall one case that came under my observation during the time of the World's Fair, and Dr. Pinckard saw it with me. The man was blind in one eye, and with the other he could see fairly well. Dr. Pinckard at the time said it was a beautiful illustration of atrophy of the optic nerve. It is unfortunate that in this case we can not get a good view of the fundus. There is undoubtedly the appearance of atrophy in the left eye on the temporal side.

NON-PIGMENTED SARCOMA OF THE CHOROID.

DR. CASSIUS D. WESCOTT.—In August, 1896, Goldie C., aged 4 years, of Madison, Wis., was referred to me by Dr. H. B. Favill, of this city, with the following history: After an attack of measles, when two and a half years old, it was noticed that she could not see with the left eye, and "something white" could be seen in it. The child had made no complaint of pain until a short time before being brought to me, and her general health seemed to be quite perfect. She had been under the treatment of a specialist in Madison for a year, but the nature of the treatment I could not learn, except that "drops" were put into the eye.

On examination I found the right eye quite normal in every way. The left eyeball was evidently larger than its fellow, but the lids were normal. The conjunctiva was not inflamed, but it was slightly œdematous, and the sub-conjunctival vessels, especially the veins, were fuller than normal. The cornea was normal, but the pupil was fully dilated and the iris pushed forward by the lens, which was almost in contact with the cornea. There was a yellowish reflex from the pupil as the eye was examined in an ordinary light, and the tension of the eyeball was + 2. No pain was complained of at the time of the examination. My diagnosis was intra-ocular tumor, probably glioma of the retina, and I advised immediate enucleation, which was consented to.

The operation wound healed promptly and kindly, and the patient returned to her home in a few days. Upon making a section of the eyeball, after hardening in formalin, the tumor was found apparently springing from the choroid in the region of the optic nerve-head, as shown in the specimen. It extended forward to the posterior surface of the lens, separating to some extent the choroid from the sclera, apparently infiltrating the choroid and retina in places as far forward as the ora serrata.

Microscopical examination of a section of the eye showed the tumor to be a small round-celled sarcoma, springing from the deeper layers of the choroid and infiltrating the retina and optic nerve. A section of the optic nerve at the point of amputation showed that the tumor-cells had infiltrated the substances of the nerve beyond that point, and I therefore expected that the tumor would return.

In May, 1897, the patient was again brought to me, when I found the orbit occupied by a new growth which nearly filled the cavity. It was immediately removed by complete exenteration of the orbit. Healing was prompt and uneventful, but in August of the same year the growth had again returned. I advised against further operative procedure, and suggested a trial of the erysipelas toxins, which was made by my friend, Dr. Van Hook, at the German Hospital. Although the usual reaction was promptly obtained and the injections were repeated quite a number of times, the treatment was without avail and the patient died December 27, 1897, with symptoms of brain tumor. No autopsy could be obtained.

This case is of interest chiefly because of the rarity of this form of tumor as compared with glioma of the retina, with which I supposed I had to deal. But the practical feature of the case is the lesson which it points, that early extirpation must be insisted upon in all cases of intra-ocular tumor, if we would save life. Another practical point which I should not fail to point out in reference to this particular case is this, that I encountered so much difficulty in removing the large eyeball without canthotomy that I did not secure as much of the optic nerve as I should, and I shall always reproach myself with the thought that, had I introduced forceps and drawn out the stump of the optic nerve and amputated at the very apex of the orbit, I might possibly have prevented the recurrence of the tumor. I was perhaps deterred from doing this at the time

because of the hæmorrhage was so considerable as to give me quite a little trouble, and the child was taking the anæsthetic badly.

PRIMARY CARCINOMA OF THE CONJUNCTIVA.

In February of this year, Joseph C., of Lighthouse, Ill., a farmer by occupation, aged 64 years, was referred to me for operation by my friend, Dr. Holmes. He gave the following history:

The patient has always been a hard working man, but enjoyed good health until within the last year or so, since which time he has been rather feeble and somewhat demented. Five or six years ago a small tumor was removed from his face which was called a cancer. Between two and three years ago the present trouble began as a spot of redness upon the upper and outer part of the eyeball. The spot soon assumed the form of a pimple, and continued to grow much more rapidly during the last few months.

Upon examination the right eye was found to be normal; the lids of the left eye were normal, but it was impossible to close them because of the presence of a somewhat lobulated tumor, projecting over the cornea. The eye and tumor were bathed in a muco-purulent discharge, and the apex of the tumor was apparently beginning to slough. The tumor was unpigmented and covered by a thin, membranous, transparent capsule, beneath which a few large vessels were easily seen.

Immediate enucleation was advised, and consented to. The operation was performed without difficulty, but was very bloody. The retro-bulbar conjunctiva above was involved in the tumor and was removed. The tumor was otherwise limited to the globe, and no secondary growth was found in the orbit, and the neighboring glands did not seem to be involved. The operation wound healed kindly in spite of the infection of the conjunctiva, and the patient returned to his home in a few days.

Upon examination of the specimen the eyeball seemed to be normal and the cornea clear, the tumor evidently growing from the conjunctiva upward and outward from the limbus. At the thickest point the tumor was 1 c.m. in thickness, somewhat oval in shape, perhaps 2 c.m wide, and $2\frac{1}{2}$ c.m. long. A section of the eyeball shows that the eye was practically normal. Microscopical examination of the tumor was made by my

friend, Professor Ludwig Hektoen, Director of the laboratories at Rush Medical College. His report is as follows:

"The eye comes bisected, each half in a separate bottle of glycerine (66 per cent.). The interior of the eye seems normal, also the optic nerve.

"The right antero-lateral quadrant of the globe is covered by an oval, concavo-convex growth which appears to spring from the conjunctiva, to which it is attached throughout. The sclera and the cornea under the tumor are intact.

"The tumor overlaps the cornea to beyond the middle line, but there is no marked organic connection between the two. The tumor is 8 m.m. thick, its longest diameters 25 and 2 c.m. Its margins are rounded, in places a little lobulated. On the cut surfaces it presents a grayish-white, almost homogeneous appearance; a few small blood vessels are recognizable.

"One-half was mounted in formalin-gelatin. From the other half pieces were taken, hardened in alcohol, imbedded in paraffin and stained in various ways.

"Microscopical examination shows that the tumor springs from the epithelium of the scleral conjunctiva. The sub-conjunctival tissue, the sclera and the cornea are intact. The tumor consists of huge branching masses and columns of epithelial cells, separated by a vascular fibrous tissue in which there is an abundant round-cell infiltration and a few hæmorrhages.

"The epithelial cells are in the main large and flat; at the periphery of the masses the cells at times assume a short columnal outline. The nuclei often lie in vacuoles in the clear protoplasm, which may have a narrow, dense hyaline border. A few atypical horny masses are met with.

"The diagnosis is carcinoma of the scleral conjunctiva."

MULTIPLE LYMPHOID TUMORS OF THE ORBITS.

The next case which I have to report is to me extremely interesting, and I regret very much my inability to present a more complete history.

The patient was a man, aged about 50 years, a grocer by occupation, who consulted me because of failing sight in consequence of tumors about the eyeballs, which had been steadily increasing in size and number for some months, during which time he had also failed in general health and had lost over 50 pounds in weight.

Upon examination I found that the lids of both eyes were normal, except that they were bulged forward owing to the presence of firm and somewhat nodular tumors beneath them. The cornea and iris were normal in both eyes and the media clear, and when the lids were raised by the fingers vision was good, but the presence of the tumors made it impossible for the patient to raise either of the upper lids fully above the pupils. The conjunctiva was not inflamed, but its vessels, especially the veins, were much full and larger than normal.

The diagnosis of multiple sarcoma was made and concurred in by my friend, Professor F. C. Hotz, and the patient advised that operation was not feasible. His son was informed that the patient would probably live a comparatively short time, as it was reasonable to suppose that similar malignant tumors probably existed in some of the internal organs.

The patient returned to his home in Michigan, but after three months I was much surprised to see him again, this time almost unable to get about because of the closure of the lids, and insisting that I operate, even if I could give him sight for only a few weeks. After explaining again the probable malignant nature of the disease, and his acceptance of the situation, I succeeded in removing the tumors which I now show you, and two or three others which have been given to my friends for pathological examination. The largest of the number was removed from the upper and outer portion of the right orbit, through an incision over $1\frac{1}{2}$ inches long, through the lid just below the brow. All of the other tumors were removed through the conjunctiva, and I can assure you that the dissection was a tedious one. But it was completed without accident and the wounds healed kindly. The tumors have remained in alcohol for four years and are much shrunken. They varied in size when fresh from that of a small dried pea to the first joint of my thumb.

The patient was rejoiced at being able to see again without difficulty, and soon returned to his home. He lived a year and a half, and died from progressive anæmia, without having any return of the tumors.

Microscopical examination of one of the tumors, made a few days after the operation, seemed to confirm our first opinion, that the tumors were sarcomata. However, as the patient continued to live on without return of the growth, the patholo-

gist changed his verdict, and I shall pronounce the tumors lymphomata. As you all know, similar cases have been reported by Dock, of Ann Arbor, in the *American Journal of the Medical Sciences*.

SUB-CONJUNCTIVAL DISLOCATION OF THE CRYSTALLINE LENS.

The last specimen which I have to present is remarkable as a curiosity. I have already reported the case in the second volume of the *Annals of Ophthalmology*.

The patient was a farmer, and, upon presenting himself, stated that five days before, while attending to his cattle, a young cow had hooked him in the eye. His family physician had told him that the eye was destroyed, and sent him to the city for its removal.

Upon examination a large, ragged wound was seen in the sclera, below and a little to the nasal side of the cornea. The anterior chamber was occupied by a blood clot and the iris could not be seen. The cornea was intact, but hazy; the wound was closed by a plug composed of blood clot and lymph. The globe was soft. The eye was easily enucleated. There was no other wound in the sclera, the horn having pierced the anterior wall of the globe only.

The specimen was put in alcohol, where it remained undisturbed for three or four weeks. Upon bisecting it I was surprised to find that the crystalline lens was encysted outside of the sclera, and that, in making the section, I had divided it. It had evidently escaped from the scleral wound, slipped back between the ocular conjunctiva and the globe, and become encapsulated in a mass of inflammatory exudate.

AMERICAN OPHTHALMOLOGICAL SOCIETY.

[Abstract Report.]

NEW LONDON, JULY 20, 1898.

DR. GEO. C. HARLAN, OF PHILADELPHIA, IN THE CHAIR.

The following gentlemen were elected to membership: Drs. J. W. Ingalls, Brooklyn; Anton Coe, Washington; F. N. Lewis, and J. H. Claiborne, New York; W. L. Wood, Portland, Oregon; J. T. Carpenter, Jr., James Thorington, W. C. Posey, C. L. Veasy, A. G. Thomson, and T. B. Schneideman Philadelphia.

Why the Proportion of Blind in the Country is Greater than in Large Cities. DR. LUCIEN HOWE, New York.

In the twenty-five largest cities of the United States the proportion of blind is with two exceptions smaller than in the States in which these cities are situated, or taking all the cities of over 50,000 inhabitants together, we find in them about 33 per cent. less blind than the average for the entire country.

Second—When we examine the different factors in the production of blindness, whether congenital or acquired, or under the latter class, whether due to traumatism, general disease, or to local diseases, we find these factors are all practically the same, or are made equal, in city and country with one exception—namely, ophthalmia of infancy.

Third—A rather extended inquiry concerning the habitual practice of physicians in country alms-houses, in hospitals and elsewhere in the State of New York, indicates that more attention is given to guarding against ophthalmia of infancy in the cities than in the country.

Fourth—This tendency to the habitual neglect, or habitual use of such prophylaxis tends to make a rapid difference in the distribution of the blind, estimated at possibly 14 to 1. It is at least the most apparent cause of this difference and probably accounts for the greater part of it.

Fifth—It follows from this apparently warrantable conclusion that if as great care were taken in general throughout the country as is given on the average in the cities to such prophylaxis, the number of blind in the United States would be decreased in a single generation by some few thousands.

While it is neither advisable nor possible to force by legislation any one method of preventive treatment upon physicians in private practice, it is the right and duty of the State to provide for children born in alms-houses the best treatment thus far known, and to require for them the use of the silver nitrate solution, or of some other prophylaxis which may in the future prove to be equally efficacious.

Report of the Committee on Resolutions Relating to Purulent Ophthalmia of Infancy.

After a full consideration of all the information at hand, including a detailed study of statistics, etc., the committee reported in favor of adopting the following resolution:

Resolved, That we approve of legislation which would result in the invariable use of this method in alms-houses, or of any other equally safe and efficient method, whereby the loss of vision from this disease would be lessened.

Some Unusual Tumors of the Eye and Orbit. DR. C. S. BULL,
New York.

DR. BULL reported one case of sarcoma which was supposed to be due to an injury of the eye received at some previous time, and a second case in which the microscopic examination showed the appearance of tubercles but in which the clinical history of tuberculosis was negative.

DR. H. KNAPP (New York) stated that these cases were rare, but that he had seen two cases where the origin of sarcoma from trauma was not problematic, but followed the injury at once.

DR. T. POOLEY (New York) reported a case in which a supposed sarcoma of the orbit had been removed and later examination showed it to be a tuberculous tumor of the lachrymal gland. The patient was a strong healthy individual without any history of tuberculosis.

Osteoma of the Orbit With Enophthalmus. DR. E. FRIEDENBERG, New York.

The two features of interest in this tumor were, first, the position of the tumor, which was located much more towards the temporal aspect of the orbit than usual, the mass of the osteoma being about at the center of the upper orbital margin, and secondly, the position of the eye, which was crowded backward into the orbit and slightly downwards, in other words, there was enophthalmus instead of the customary exophthalmus. The tumor with the anterior wall of the sinus was chiseled away and the patient made a good recovery, though the eye remains still slightly lower than its fellow. Vision of $\frac{22}{C}$ was improved to $\frac{20}{L}$ by the use of glasses; the Javal ophthalmometer showing the presence of 8 D. astigmatism, which was corrected by + 4 D. cyl. ax. 90° \ominus - 4 D. cyl. ax. 180° .

Abscess Involving the Frontal Sinus With Destruction of the Vault of the Orbit and Depression of the Eyeball. DR. C. F. CLARK, Columbus, Ohio.

This abscess seemed to occur as the result of traumatism, the patient having received a blow in the face about a year previously, and having suffered more or less continuously with headaches and other symptoms that might be attributed to abscess in the sinus. The bone had been eroded to such an extent that the brain cavity was invaded, and the depression of the eye was sufficient to produce a hyperphoria of the opposite side equal to $5\frac{1}{2}^\circ$. The patient did well after operation, but the wound has not thoroughly healed, probably because of the presence of some sequestra.

During the year before she came for treatment she would occasionally have attacks of pain followed by discharge of mucus and pus from the nose and mouth, and she noticed that at such times the size of the swelling of the orbit diminished. Pressure over the swelling met with such firm resistance that it was at first suspected that the condition was produced by an osteo-sarcoma.

A Large Tumor of the Orbit (Fibro-Sarcoma) of Twenty Years' Standing; Removal. DR. F. M. WILSON, Bridgeport, Conn.

DR. WILSON exhibited this pathological specimen, which was of immense size for an orbital tumor. The patient had had the power of opening the lids, but could not close them over the tumor except by taking hold of the free border of the upper lid and pulling it out. The tumor had existed for a remarkably long time and there were conflicting opinions as to the advisability of an operation. The operation seems so far to have been a success. Although the eye was so displaced that the cornea was $1\frac{1}{4}$ inches in front of the orbit, motility of the iris and some vision had been retained.

DR. POOLEY remarked that in New York a tumor seldom got the opportunity to grow to such a size. He had seen the case previously and advised operation.

A case of Lipoma of the Orbit. DR. EMIL GRUENING, New York.

DR. GRUENING referred to the very great rarity of lipomas of the orbit, and then reported his case which occurred in a young man. It was a lobulated tumor about the size of a lima bean, and microscopic examination showed nothing but fat cells. The author stated that most tumors of this class that been had heretofore reported were sub-conjunctival tumors.

DR. HOLDEN stated that the more we examine tumors of the orbit the more surprised are we at the great variety that occur there. He referred to one $1\frac{1}{3}$ inches in length by $\frac{3}{4}$ of an inch in width, two-thirds of which was purely lipoma, a small portion angioma, and one end of it distinctly fibromatous, and said that the association of these three variations was not uncommon.

DR. H. KNAPP reported a case parallel with Dr. Gruening's, in which the tumor was partially encapsulated and was so large as to necessitate its removal in three sections at three different operations.

The Treatment of Entropion of the Lower Lid With Caustic Potash. DR. SAMUEL THEOBALD, Baltimore. (See next No.)

In applying this method the aim should be to produce a

scar 3 to 4 mm. wide, parallel with the lid margin and extending the whole length of the tarsus. The action of the caustic should not be allowed to approach nearer the edge of the lid than $1\frac{1}{2}$ to 2 mm. When the requisite effect has been produced the caustic action is checked by the application of vinegar diluted with an equal quantity of water, or a solution of acetic acid of about the same strength. The eschar soon begins to contract and the lid, which up to this time has been held in an everted position, no longer shows an inclination to turn in. It is seldom necessary to repeat the operation, but it can be done if necessary.

Dr. Theobald thought the treatment especially applicable to senile entropion, but useful also in other varieties. Better results, it was thought, could be obtained by the use of the caustic than by the knife and no other anæsthesia is necessary than the local application (on cotton) of cocaine.

Dr. Knapp thanked Dr. Theobald for his paper and said that senile entropion had vexed him considerably. He had employed a number of operations but without equal or satisfactory success. He thought the method proposed was more thorough and better adapted to the purpose than the actual cautery.

Dr. Abbott asked why soaking the lids with cocaine was considered preferable to its hypodermic use.

Dr. Theobald replied that he did not specially prefer it, but had not found the hypodermic necessary. He referred also to some cases in which the other operations had been performed without success and in which the caustic potash accomplished the desired result.

Dr. Gruening stated that he had found an operation similar to Hotz's method entirely satisfactory.

Dr. Noyes stated that he used a similar operation, but removed a narrow strip of skin and inserted deep sutures into the orbital tissue.

Lymphoma of the Lids. DR. MYLES STANDISH, Boston.

Dr. Standish reported a lymphomatous growth in the lower lid close to, but not involving, the lachrymal sac. The administration of arsenic had resulted in its cure.

Dr. De Schweinitz referred to a number of lymphomas

and sarcomas that had been favorably treated with preparations of arsenic and stated that while we must not depend entirely upon the administration of arsenic in morbid growths there are a sufficient number of cases improved by its use to show that we must be careful about operating simply upon the clinical diagnosis of these tumors.

A case of Spindle-Cell Sarcoma Involving the Conjunctiva and Cornea ; Removal of Growth Without Impairment of Sight.
DR. S. B. ST. JOHN, Hartford.

The patient was a man, aged 72 years, who had lost the right eye twelve years previously as the result of traumatism. The growth appeared upon the left eye and grew in two and a half months from the size of a pinhead to that of a large pea. It sprang from the conjunctiva, was movable with that tissue, and overlapped the cornea. It was removed much after the fashion of a pterygium operation.

Conjunctival Melano-Sarcoma Involving the Cornea. DRs. JOHN GREEN and A. E. EWING, St. Louis.

The tumor was a true melano-sarcoma involving the tissues above named to such an extent and was of such a size that it became necessary to enucleate the eye.

Hypopyon Keratitis, Break in Descemet's Membrane ; Preceding Perforation Fluorescine Passed Through the Ulcer Into the Anterior Chamber. DRs. JOHN GREEN and A. E. EWING, St. Louis.

A case of traumatic ulcer of the cornea was reported in which hypopyon of 5 mm. in height occurred. The treatment which Dr. Ewing followed with good result was the free use of hydrogen peroxide solution of normal strength, applied on a little mop to the surface of the ulcer, held there, and the application renewed a half dozen times until cessation of the ebullition had taken place. On using this application bubbles of gas would appear in the anterior chamber, but this was rapidly absorbed and in a few hours nothing remained of it.

Fluorescine produced its characteristic reaction. The hydrogen peroxide seemed to have the effect of breaking up the hypopyon mass and producing the good results that occurred.

The conclusions are that one source of hypopyon keratitis is through a direct break in Descemet's membrane, or by exudation from the iris, or thirdly, possibly from the epithelium of Descemet's membrane.

DR. HOLDEN opposed the idea that the hypopyon could come from the cornea, and cited Elschnig's recent experiments to prove that just the reverse happened, and that the pus cells found in the cornea had gotten there secondarily. He believes that the break in Descemet's membrane always begins with changes on its posterior surface.

A Case of Interstitial Keratitis Congenital in Origin. DR. H. F. HANSELL, Philadelphia.

The patient was first seen when only 36 hours old and presented these symptoms: A thin watery discharge from the eyes, lids slightly swollen and bluish-red in color, conjunctiva smooth, but the ocular portion distended from the fornix to the limbus of the cornea by an almost transparent effusion. The cornea showed, on inspection a gray infiltration of the deep layers consisting of fine points that tended to become confluent, most dense over the pupil, without vascularity or loss of epithelium. The child was poorly nourished, probably because of the fact that the mother, though ordinarily a healthy woman, had been in bad health throughout the pregnancy. There was no history of specific disease. The child was given tonic treatment, and at the end of six weeks there remained only a slight opacity of the right eye. The local treatment consisted of the application of mydriatics. A similar case was referred to which was reported by Barnacheff, in which the cornea became entirely clear.

New Treatment of Ulcers and Other Infectious Diseases of the Eye by Cassareep. DR. S. D. RISLEY, Philadelphia.

This preparation is made from the juice of the black cassava, was introduced here by Dr. Chandler, and is used in a 10 per cent. ointment. It is applied freely between the lids and

the eye subjected to massage to distribute it, and in the corneal cases the protecting bandage applied. It causes no irritation and rapidly produces improvement.

DR. JOHN GREEN stated that he had seen the natives making cassava bread, and that amongst them the juice had the reputation of being preservative to the flesh.

DR. MYLES STANDISH had been using the preparation since Dr. Chandler originally introduced it and thought that in cases of corneal ulcers, if the ointment be used for some time after healing has occurred, the scar is less dense than if treated by other means.

DR. JACK had used the preparation, but said that in some cases it had been rather irritating.

DR. RISLEY stated that he had not noticed any difference in the degree of opacity as compared with other methods of treatment, but believed that that would depend rather upon the amount of tissue destroyed.

AFTERNOON SESSION.

Spontaneous Expulsion of a Foreign Body From the Anterior Chamber. DR. J. P. WORRELL, Terre Haute.

The patient was a boy who had received an injury of the right eye while exploding a gun-cap by striking it with a hammer. After the inflammation had cleared up a small piece of bright metal could be seen on the inner surface of the cornea. The patient declined operation for its removal, and some days later appeared with the statement that, "feeling something scratching the eye he rubbed it with a bit of cotton and removed, with some secretion, a small piece of bright copper." No inflammatory trouble followed.

DR. HANSELL reported a case where a piece of steel had been in the anterior chamber, according to the patient's story, fifteen years, and was spontaneously extruded.

Some of the Earlier Symptoms of Senile Cataract. DR. W. F. MITTENDORF, New York.

DR. MITTENDORF has carefully observed the last 508 cases of incipient senile cataract that have appeared in his practice

in order to determine the exact location of the first changes in the transparency of the lens. Of these 106 were central and 402 peripheral, and of the latter the starting point of the striæ was found in the upper periphery in 13 cases only, in the outer periphery in 47, in the general periphery 48, and the greatest number, 286 cases, in the lower and inner quadrant. Admitting that cataractous changes do not depend upon senility alone, but more particularly upon the nutrition of the lens, Dr. Mittendorf offers as a possible reason for the great prevalence of opacities in the lower inner quadrant the theory that there is a constant accommodation for small objects, especially reading by artificial light, requiring a more or less forced convergence and a downward look, during which the pressure upon the surrounding tissues is an impediment to the nutrition of this particular portion of the lens.

DR. RISLEY thought that these opacities in the lower and inner periphery of the lens are often associated with choroidal disturbances in that section. He had noticed it particularly among iron workers where it seemed to be due to the heat to which they are subjected, this being the least protected portion of the eye.

The Operations for Secondary Cataract. DR. H. KNAPP, New York.

DR. KNAPP reports a very interesting case of secondary cataract operation. The primary operation for removal of the cataract was without special interest. The capsule becoming cloudy and necessitating a secondary operation, it was needled in the ordinary way. The immediate result was good, but two days later reaction occurred and a severe, acute glaucoma set in. An iridectomy was at once attempted, but it was found impossible to catch hold of the iris so the operation was abandoned. The patient was relieved, however, of all pain and discomfort as a result of the paracentesis and remained so for four days when trouble again set in. A second attempt at iridectomy was made and this time successfully. The relief was permanent.

Dr. Knapp then gave a tabulated report of 70 cases of secondary cataract operated upon since October, 1897. Sight was improved in 63, remained the same in 6, and was almost

lost in 1. Two cases besides the one quoted above were complicated by glaucoma, one of them being relieved by myotics and the other by an iridectomy.

Considering the advisability of operating in cases that have vision not below $\frac{20}{LXX}$, the author says that it must depend upon the case, but that ordinarily he believes we should attempt to give the patient the best sight his eye is capable of, especially as the secondary operations, rare accidents excepted, are safe.

He considers discision the proper operation and lays down as a rule of paramount importance "cut, don't tear." As the region of the wound made in the primary extraction is the weak point in these eyes he considers it advisable to avoid that region as much as possible in the secondary operation and a T-shaped incision in the capsule is thought to be best, the horizontal arm of the T being situated below the linear scar, which Dr. Knapp makes in the capsule when extracting.

DR. ROOSA advocated the plan of removing the capsule in the secondary operation instead of doing a discision.

DR. NOYES preferred the discision and stated that he had occasionally introduced a long needle through the sclera, because it gave a better leverage when cutting the capsule. Occasionally he had used a second needle passed through the cornea at the same time.

DR. C. J. KIPP referred to the difficulties encountered in attempting to remove the capsule.

DR. CALLAN stated that he found himself more and more inclined to the use of the DeWecker scissors.

DR. POOLEY thought that all the operations, other than discision with a sharp needle knife, were open to serious objections.

DR. KNAPP thought that discision is by far the safest operation and is indicated it at least 95 per cent. of cases.

Delayed Union After Cataract Extraction. DR. GEO. C. HARLAN, Philadelphia.

DR. HARLAN reports two more cases of delayed union after cataract operations, in one of which union took place somewhere between the tenth and seventeenth days and in the other at the end of twenty days. By a review of the literature

he found 26 similar cases in which the delay had lasted from five to twenty days. In 20 of these cases no cause could be given for the wounds having remained open. He states that such cases seem to require no special treatment other than atropia and slight pressure bandage, together with treatment of any complications that may arise.

DR. NOYES had had such a case in a gentleman over 70 years of age, where the wound failed to unite for over a fortnight, the edges of the wound being actually inclined to eversion. The wound finally healed and the man enjoyed good vision for ten years.

DR. GRUENING believed that one cause of the delay might be that the operation had been done within the clear cornea and thinks that he gets most rapid healing when he makes a conjunctival flap.

THURSDAY, JULY 21.

Protargol in the Antiseptic Preparation of the Conjunctiva Prior to Cutting Operations on the Eyeball. DR. B. E. FRYER, Kansas City, Mo.

DR. FRYER uses a 2 per cent. solution of protargol as an antiseptic and finds it preferable to solutions of bichloride, etc. It is destructive of all organisms and is not irritating.

Buphthalmia—An Interesting Series of Cases Occurring in the Same Family. DR. WALTER B. JOHNSON, Patterson, N. J.

Three children in one family were found buphthalmic within the first few years of life. Ophthalmic examinations were not satisfactory. Two of the children were operated upon in Naples and the third here by Dr. Johnson. In every case the progress of the disease was arrested. The mother's eyes were normal, but the father thought he had never seen out of one eye, in which a disintegrated calcareous lens prevented a fundus examination.

DR. HARLAN recalled the statement of Mauthner made some some years ago that buphthalmia is simply congenital glaucoma.

Contribution to the Pathology of the Eye and Its Appendages.

DR. G. E. DE SCHWEINITZ, Philadelphia.

CASE 1.—Primary carcinoma of the caruncle. A small growth entirely replacing the right caruncle, about the size of an ordinary pea, and which had existed for a number of years. Microscopic examination proved it to be carcinomatous. So far as known there has been no recurrence.

CASE 2.—Prelachrymal growth with the histological characters of tubercle. A small tumor anterior to the lachrymal sac was discovered while probing the tear-duct. It was easily removed, and on examination showed the appearance of tubercle, although no tubercle bacilli could be found.

CASE 3.—Angioma of the lachrymal gland extending to the apex of the orbit; removal with preservation of the globe, functions of the eyeball and of the external ocular muscles with the exception of the levator which was involved in the growth. This tumor, which is exceedingly rare, consisted of an angiomatous growth involving the lachrymal gland and extended deep into the orbit. It was probably congenital. In front of the ear, on the same side, there was a small cavernous angioma about one and a half inches in length and one inch in width, but not communicating with the growth of the lids.

DR. FRYER asked if, in the examination of the carcinoma, coxidia had been found.

DR. DE SCHWEINITZ said that he believed that there was considerable mythology connected with the pathology of coxidia.

DR. BULL reported a similar case of prelachrymal growth which had been removed on the supposition that it was a cyst.

Remarks on Cases of High Myopia; Treatment of One Case by Removal of the Crystalline Lens. DR. H. D. NOYES, New York.

The interesting features of this case are: the early occurrence of convergent squint; that a rapid development of myopia occurred between 6 and 8 years of age; that the removal of the lens produced a change of 16 D. and with it an improvement of vision to double the previous condition; that binocular vision was not secured by the refractive changes and that diplopia was never observed.

Contribution to the Operative Treatment of High Myopia, With Report of an Additional Case. DR. W. H. WILMER, Washington.

In the case reported by Dr. Wilmer the operation decreased the myopia by 22.5 D., and the vision was double what it had been before operating. In regard to the mode of operation the author preferred a slight discision, making a very small opening in the anterior capsule, followed by extraction within six days. As to the amount of myopia which offers the best operative result, he considers the ideal case to be the one wherein two or three dioptries of myopia would remain after the operation. According to his experience, this would mean a myopia of twenty-five dioptries.

DR. NOYES believed that if the operation were limited to cases of this degree the amount of choroidal trouble would be so great as to incur great risks in the operation. He believes that we are justified in operating in young subjects with 13 D. or more of myopia if the fundus is in good condition.

The Pathology of Experimental Quinine Amblyopia. DR. WARD A. HOLDEN, New York.

DR. HOLDEN'S experiments were made with the aid of the newer stains for nerve tissues and he exhibited drawings showing the changes that exist at various stages of the quinine poisoning.

The first changes were shown in the breaking down of the ganglionic cell bodies and a deposition of myeline-like substance in the nerve fibers. This appeared within three days after administration of toxic doses. From that time until the seventeenth day more ganglion cells were destroyed and at that time the changes in the optic nerve consisting of a breaking down of the medullary sheaths of the fibers was noticed. By the forty-second day the ganglion cells and the nerve fiber layer had almost entirely disappeared and the degeneration could be traced up to the external geniculate body and pulvinar. No signs of degeneration could be found elsewhere in the brain or cord.

Two Cases of Premature Delivery to Preserve Sight. DR. A. E. ADAMS, Newberg.

DR. ADAMS reports two cases of albuminuric neuro-retini-

tis occurring in pregnant women, with vision reduced to a very low point. Shortly after premature delivery the vision showed marked improvement, and the author concludes that if abortion is ever justifiable it is in these cases, especially as the uræmic condition of the blood is dangerous to the life of the fœtus as well as a menace to the mother.

Implantation of Sponge in the Orbit After Enucleation. DR. S. B. RISLEY, Philadelphia.

A fragment of surgeon's sponge, carefully sterilized, was pared down to a size just sufficient to fill loosely the cavity left by the removal of the ball and to permit the suturing of the conjunctiva and the sub-conjunctival tissue over it without undue tension.

The design was to furnish a frame work for the deposition of connective tissue in the orbit and thus avoid the concaved socket which follows enucleation, and always permits the accumulation of tears and mucus behind the artificial eye. After the operation the appearance was much the same as that presented after the insertion of a glass globe as in the Mules' operation. Two or three months is required to complete the process of absorption of the sponge and the deposition of new tissue.

Exhibition of Chalazion Forceps. DR. C. J. KIPP, Newark.

These consisted of a simple forceps, one blade of which was solid, and the other contained a slit, so that when this blade is placed over the conjunctival surface of the chalazion the latter may be incised through the slit and its contents squeezed out by pressure.

IT IS with sincere regret that we hear of the death of Dr. T. E. Murrell, formerly of this city, at Denver, Colorado, from pulmonary hæmorrhage.

AT THE Denver meeting of the American Medical Association, Dr. Casey Wood of Chicago, was elected Chairman, and Dr. C. H. Williams, of Boston, Secretary of the Ophthalmological Section.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED
KINGDOM.

H. R. SWANZY, F.R.C.S.I., President, in the Chair.

FRIDAY, JULY 8, 1898.

Subconjunctival Bloodletting for Hæmorrhagic Retinitis.—

MR. RICHARDSON CROSS read this paper. Recognizing the fact that a considerable amount of blood escaped from the wounded vessels in squint and other subconjunctival operations without any ill-effect, the author determined to try the effect upon intra-ocular hæmorrhage or congestion of a more or less free division of the blood vessels running along the muscles and in the subconjunctival tissue. For this purpose he made free incisions beneath the conjunctiva either between the inferior and internal recti, or between the superior and external recti; the incisions were followed by the use of hot fomentations. From the result of this kind of interference in several cases, the author felt justified in recommending this plan of abstracting blood from the branches of the ophthalmic artery. In one case in which there were numerous retinal hæmorrhages round the disc, with much congestion of the retinal vessels, and some optic neuritis, leeches and general medical treatment had been applied without benefit, and V. was reduced to $\frac{6}{LX}$. Free incisions were made into the subconjunctival tissue with strabismus scissors so as to lacerate as many vessels as possible, and warm fomentations were afterwards applied. The next day the pupil was dilated, and there was marked diminution in the swelling of the disc, with an improvement in vision. This improvement was steadily maintained, and the vision was eventually completely restored. Several other cases were quoted in which considerable improvement resulted.

The Mechanism of the Conjugate Movements of the Eyelids.

—DR. ALDREN TURNER read this paper. He showed that there was accumulating evidence in favor of the sixth nerve nucleus being the lower or pontine center for the associated action of the internal and external recti muscles; and that the fibers from the sixth nucleus of one side probably passed directly into the third nerve of the opposite side, without the intervention of cells in the third nucleus, facts which indicated

that the internal recti were doubly innervated; on the one hand, from the third nucleus for convergence, and on the other from the sixth nucleus, for lateral movement. Respecting the path by which impressions were conveyed from the cerebral cortex to the sixth nucleus, he referred to an experiment in which the tegment of the pons was divided without interference with the sixth nucleus. As a result, conjugate deviation of both eyes to the opposite side, with inability to move them to the side of lesion, was observed. The conclusion drawn from this observation was that the cortico-pontine fibers decussated in the neighborhood of the quadrigeminal bodies, and passed downwards in the tegment of the pons to the sixth nucleus.

THE PRESIDENT made some observations on the position of the nuclear center for convergence, and on the probability of there being not one but several cortical centers for conjugate movements of the eyes.

MR. JESSOP thought that absence of convergence power was a very rare condition; he knew of only one case, in a boy subject to epileptic fits. He had advanced both internal recti, with the result that the boy now had several meter angles of positive convergent power.

In reply, DR. TURNER stated that he had only seen one case of paralysis of convergence, while the conjugate movements were unaffected. He referred to the loss of pupillary contraction on attempts at convergence in that case, while the pupillary light reflex was retained. This phenomenon was the converse of the Argyll-Robertson pupil.

Large Clear Cyst of the Conjunctiva.—MR. SIMEON SNELL (Sheffield) related particulars of this case. The cyst was as large as a hazel nut; it was concealed almost entirely by the lower eyelid, but when the lid was drawn down it bulged forward. The patient was 23 years of age; the cyst had been noticed since childhood but was then quite small. Ten months before coming under observation he was struck over the cyst, which enlarged and became bluish in color; before this it was transparent. Microscopical examination of the cyst made by Mr. Treacher Collins showed it to be lined throughout by a single layer of endothelial cells, outside which was some moderately dense fibrous tissue with patches of round-celled infiltration in it. The cyst was probably lymphatic in origin.

Chancre of the Lachrymal Sac.—MR. SIMEON SNELL related this case. The patient sought advice for what he deemed subacute inflammation of the lachrymal sac. When seen there was no ulceration of the sac but there was a more than usual defined margin to the swelling. There was nothing to suggest a primary lesion. Later the canaliculus was slit up and the duct probed with some slight relief; afterwards a macular syphilide appeared on the chest and arms with ulceration of the tonsils. Presuming the lesion of the lachrymal sac to be a primary sore, the secondaries appeared in correct sequence as to time, the first swelling of the sac being noticed on April 3, and the rash appeared on May 13. The thickening of the sac and the rash quickly dispersed under mercurial treatment.

Card Specimens.—The following were the card specimens:
Mr. Richardson Cross: Plastic Operation for Contracted Socket.

Mr. Ernest Clarke: Pimped Mole of Face and Eyelids.

Mr. Adams Frost: Case of Pseudo-Glioma.

Mr. Marcus Gunn: Preparation of a Sclerosed Retinal Artery.

PAMPHLETS RECEIVED.

"Diseases of the Lachrymal Passages; Their Causes and Management," by L. Connor, M.D.

"The Prevention of Diseases Now Preying Upon the Medical Profession," by L. Connor, M.D.

"The Form of the Source of Illumination (Illuminated Square) for Skiascopy," etc., by A. Antonelli, M.D.

"The Importance of the Early Recognition and Treatment of Inflammatory Glaucoma," by C. A. Veasey, M.D.

"Pathological Report on the Eyes of Dr. Hirsch's Patient With Amaurotic Family History," by W. A. Holden, M.D.

"The Employment of Solutions of Toluidin-Blue as Collyria and as a Stain for Corneal Abrasions and Ulcers," by C. A. Veasey, M.D.

"Report of a Case of Acute Glaucoma Complicated by Cataractous Formation of Lens and Anterior Dislocation of Same. Complete Recovery Without Operative Interference," by S. P. Eagleton, M.D.

THE AMERICAN JOURNAL OF
OPHTHALMOLOGY.

VOL. XV.

OCTOBER, 1898.

NO. 10.

ORIGINAL ARTICLES.

WHY THE PROPORTION OF BLIND IN CITIES IS
LESS THAN IN THE COUNTRY.

BY LUCIFEN HOWE, M.D., BUFFALO, N. Y.

IT IS rather a surprising fact that the number of blind in the large centers of population in this country is relatively smaller than the number in the whole State in which the given city is situated. In order to show this at a glance, a table has been constructed which contains in the first column the twenty-five largest cities arranged according to population. In the second column is shown the relative proportion of blind per million in these cities, and in the county in which each is located, and in the third column, the proportion of blind in the entire State. The reason for selecting the population of the county, and not of the city alone is that in some instances, like Boston, for example, the city proper includes a comparatively small part of the thickly settled region. In the next column the proportion of blind is given per million, not only in order to state the ratio more exactly than by the percentage, but also to have this column correspond with similar columns given in the United States census report for each State. Of these twenty-five largest cities in the United States, there are only two in which the number of blind in the city is larger than in the State, and in one of these the difference is exceedingly small.

NUMBER OF BLIND PER MILLION.

CITY.	IN COUNTY.	IN STATE.
New York City.....	496	732
Chicago, Ill.....	313	741
Philadelphia, Pa.....	780	747
Brooklyn, N. Y.....	332	732
St. Louis, Mo.....	495	917
Boston, Mass.....	645	824
Baltimore, Md.....	754	786
San Francisco, Cal.....	561	645
Cincinnati, Ohio.....	675	918
Cleveland, Ohio.....	479	918
Buffalo, N. Y.....	532	732
New Orleans, La.....	999	766
Pittsburgh, Pa.....	494	747
Washington, D. C.....	789	799
Detroit, Mich.....	474	776
Milwaukee, Wis.....	432	725
Newark, N. J.....	409	581
Minneapolis, Minn.....	393	493
Jersey City, N. J.....	421	581
Louisville, Ky.....	811	1063
Omaha, Neb.....	177	536
Rochester, N. Y.....	516	732
St. Paul, Minn.....	250	493
Kansas City, Mo.....	635	917
Providence, R. I.....	772	889

Or, taking all of the cities of over fifty thousand inhabitants together, we find in them about 33 per cent. less of blind than in the average for the entire country. A similar relation has been found to exist in Russia between the blind population in the cities and in the country. Having thus shown the fact, let us next inquire what causative factors are fixed and what ones, by varying, may account for this difference. The various causes of blindness are naturally divided into those which are (1) Congenital, or (2) Acquired, the latter being subdivided into causes due to traumatism, to general diseases, and to local diseases. The first class can, of course, be left out of account. As for traumatism and general diseases there is every reason to conclude that these would be more potent in the cities, where factories and like industries are numerous, and

the general results of crowd-poison more serious, of course, than in the country.

It remains only to consider the local diseases. These are likewise equally common to city and country—except the contagious forms which, of course, can be more rapidly spread in large workshops and residential schools than from one farm to another. But this factor, like the one before, although against the city, is probably balanced about equally by the means afforded for obtaining prompt relief from these, or all other diseases of the eye—that is, by the abundance of physicians and even the super-abundance of hospitals and infirmaries and also by the ready access to them by good roads or by transportation by steam and electricity.

Thus, as we consider the different eye diseases in turn, we find the conditions in regard to each practically the same, or about equally balanced, between city and country, until we come to one disease which in this connection is all-important. That is ophthalmia of infancy. Long ago I suspected, as most others have, that more care was taken to prevent this disease by the use of the silver nitrate solution, or other prophylaxis, by the average well-equipped city doctor, no matter in what social stratum his practice might be, than was taken on the average by his brother in the country, who is necessarily hampered by greater inconveniences and difficulties. Especially did it seem probable that the gain or loss would be great in alms-houses or lying-in institutions, where any variation in the amount of care in this respect would also, in the aggregate, have great and far-reaching effects. Therefore, with the hope of obtaining some data on this point more or less reliable, last year I sent a letter to the physician-in-charge of county alms-houses in New York State, hoping to learn what was the habitual procedure of these practitioners. With other questions, the letters asked the number of births during the previous year, in about what percentage of cases the Credé method was used, and what percentage of children developed ophthalmia of infancy. To these letters forty-seven replies were received—in thirty-eight of these alms-houses children had been born the year before. In only seven of these institutions was the silver nitrate solution used as described by Credé, and three of these seven were from counties belonging to cities of over thirty thousand inhabitants. In other words, such pro-

phylaxis was used in only three out of thirty-four county almshouses in the rural districts. It is fair to assume that this represented the average opinion and the habitual practice in those counties and in others in that State and elsewhere. Now, on the other hand, desiring to learn the opinion and habitual practice of obstetricians at least in one large city, a similar letter was sent to members of the New York Obstetrical Society asking, among other questions; whether it was considered that the silver nitrate solution should be always used in public institutions, and also whether it should be made obligatory there. Replies were received from thirty five members. Twenty-eight of these advocated its invariable use in public institutions, and twenty-two of them thought that it should be made obligatory there. It is fair to assume again that this represented the average medical opinion and habitual practice in that city and in others in that State and elsewhere. It is also proper to note that this opinion of obstetricians relates to "public institutions" of any kind, and it is quite probable, if asked whether or not the so-called Credé method should be made obligatory in almshouses only, there would be not simply this large majority to advocate it, but they would be almost unanimous in doing so.

These thirty-eight attending physicians of county almshouses, on the one hand, and thirty-five obstetricians on the other, might alone serve to indicate the rather different views and methods of the two classes of practitioners. But it is possible to approximate a little nearer to the frequency with which the silver nitrate solution is used in the city as compared with the country, by noting what the practice is in general hospitals and similar institutions which are not county almshouses.

In order to ascertain this, a letter of inquiry was sent to these institutions in New York State, with the same questions, so far as concerned the use of silver nitrate, as to the almshouses. Among the replies received, in thirty-five of these institutions children had been born the previous year, in thirteen the Credé method was invariably used, in four it was used with some modification, in five it was used in suspicious cases, in thirteen the average number of births was three and in none of these had the silver nitrate been used.

Considerable space might be devoted to the analysis of

these figures, small though they be, but for our present purpose it is sufficient to state the general rule, which is, that silver nitrate is used as recommended by Credé, in the larger institutions in the large cities, and this and other methods of prophylaxis omitted in the smaller ones. In the first class given above are most of the metropolitan lying-in hospitals, such, for example, as the Sloane Maternity, the Lying-in Hospital, Bellevue, and others of that class, whereas the thirteen at the other end of the list include for the most part small institutions in small cities or the larger towns. It might almost be said that the regularity and care with which the Credé method is used, is in direct ratio to the number of births in the institutions. All of these data, with others, have been already referred to elsewhere, and are still in the process of elaboration.

I am aware that the figures are too small, from even a single State, to serve as a basis for any valuable calculation. But I do think that anyone who studies them carefully will conclude that, in general, a decided difference does exist between the practice of obstetricians in the cities and these physicians-in-charge of county alms-houses. And what is true of one State is probably true of others.

In order to appreciate the very great effect produced by even a slight but habitual variation of this factor, it is necessary to recall briefly the well-established data in regard to such prophylaxis, and to the frequency of the disease itself. The evidence in regard to the effect of solutions of silver nitrate and of other methods of prophylaxis has been gradually collected, during nearly twenty years, as published from the combined experience of different obstetricians in different countries, until now there are accurate records of over fifty-four thousand births, and among these the silver nitrate solution having been used over twenty-four thousand times. These data not only show, as has been frequently pointed out, that the silver nitrate solution is the best, taken altogether, that is thus far known, but that without it, the percentage of cases of ophthalmia is about fourteen times as great as when no precaution is taken. Now it is also equally well known that this disease produces, with possibly a single exception, more blindness than does any other; evidently, therefore, any tendency to neglect this precaution or some other equally effective, in the country, as compared with the city, would tend to multiply

the victims of the disease much more rapidly in one locality than in the other.

To recapitulate, the points to which attention is called are :

1. Blindness is more frequent in the country than in the cities.

2. On examining the different factors in the production of blindness we find that these are either the same or made practically the same in city and country with one exception. This exception is ophthalmia infancy.

3. A comparison of statements made by thirty-eight county alms-houses and by thirty-five obstetricians in the most populous State in the Union, indicates that decidedly less attention is given to guarding against ophthalmia of infancy ; especially is the silver nitrate used less as a prophylactic in the country than in the cities.

4. This tendency on the one hand to habitual neglect, or on the other hand, to habitual use of such prophylaxis, is not only the most apparent cause of such variation—if, indeed, any other reasonable cause can be discovered—but it probably accounts for the larger part of this difference in the distribution of the blind.

If that proposition is warranted—and it seems to be—the corollary from it is important, as it indicates what might be done if this prophylaxis or some other equally effective were universally used. As the cities of fifty thousand inhabitants and upward in this country show an aggregate of six thousand two hundred and seventy-two blind persons, and as the number is, as before stated, about 33 per cent. below the average for the whole country, it follows that if the same care were universal, the number in the country districts could also be reduced to 33 per cent. This would mean a total saving of not simply hundreds but at least a few thousand from blindness. It is beyond the scope of this paper to refer to the question of legislation to enforce proper prophylaxis. As far as private practice is concerned, parents will insist upon their own methods, as they have a right to do, in a free country. But as to children in alms-houses, who are specially the wards of the State, who must be supported by the State if they become helpless, and for whom it is the duty of the State to obtain the best treatment known, it does seem that we, as ophthalmologists, should join with the expert obstetricians, so large a

proportion of whom apparently believe that the Credé method should be made obligatory in public institutions.

Or, if it appears a dangerous precedent to advocate any one method of treatment, no matter how excellent that may be, it is at least possible to advocate this with any other equally effective prophylactic which may be found in the future, and thus avert to some extent this wanton and continued destruction of vision.

THE TREATMENT OF ENTROPION OF THE LOWER LID WITH CAUSTIC POTASH.¹

BY SAMUEL THEOBALD, M.D., BALTIMORE, MD.,

CLINICAL PROFESSOR OF OPHTHALMOLOGY AND OTOTOLOGY, JOHNS HOPKINS UNIVERSITY.—SURGEON, BALTIMORE EYE, EAR AND THROAT CHARITY HOSPITAL.

ALTHOUGH in the just issued, third volume of Norris and Oliver's "System," I find in Dr. Harlan's chapter upon "Diseases of the Eyelids," this statement—"The formation of cicatrices by actual or potential cautery (for the cure of entropion) was formerly practiced, at first by the Egyptians, but may be considered obsolete," I still have the hardihood to bring before the Society the subject described in the title of this paper and to speak rather enthusiastically of the favorable results which, in suitable cases, this method of treatment yields.

At the outset it may be stated that the cases to which it is pre-eminently adapted are those of senile entropion, from relaxation of the lid tissues, but that it also yields good results in those which are consequent upon trachoma and are attended by an in-curving of the tarsal cartilage.

To those who have had no experience in this method of dealing with entropion of the lower lid the questions would naturally suggest themselves: Why use a caustic rather than the knife to accomplish the end in view? And, if a caustic agent is to be employed, why select caustic potash rather than the galvano- or thermo cautery? My answer would be that it is not an easy matter to determine just how much tissue to remove with the knife, and that from an experience with both

¹Read before the American Ophthalmological Society, July 19, 1898.

methods I have found the desired effect can be obtained more exactly with the caustic than with the knife. It would seem, moreover, that the destruction of a given amount of tissue by the potash produces a somewhat greater mechanical effect than the removal of the same amount with the knife. As to the choice of a caustic agent, the potash, though painful, can be readily used with the aid of a local anæsthetic, whereas the application of the actual cautery in such close proximity to the eye is impracticable without the induction of general anæsthesia.

There is not, so far as I am aware, anything novel in the manner in which I have employed the potash; but to those who may wish to try this plan of treatment a few suggestions as to details may be useful.

In the first place, the crayon of caustic potash must not have too blunt an extremity, otherwise it will be difficult to apply it with the requisite degree of exactness. The sharpening is easily accomplished by rubbing the end of the crayon upon moistened blotting-paper, whereas to sharpen it with a knife is exceedingly difficult.

Soaking the lids for ten or fifteen minutes with a strong solution of cocaine appreciably lessens, though it does not annul, the considerable pain which the action of the caustic produces.

In applying the caustic our aim should be to produce an eschar 3 to 4 mm. in width, parallel with the lid margin and extending the whole length of the tarsus. At no point should the action of the caustic be allowed to approach nearer the margin of the lid than $1\frac{1}{2}$ to 2 m.m., and as the destruction of tissue tends to spread considerably beyond the actual point of contact of the crayon the line of application of the latter should be about 4 mm. from the ciliary border. Along this line, the lid meantime being everted and kept well upon the stretch, the crayon should be drawn back and forth several times, until the epidermis is destroyed and the tissues beneath begin to assume a brownish color. Holding the lid carefully so that it shall not become inverted, the action of the caustic is allowed to extend as far as may seem desirable, when it should be arrested quickly by the application of an acid solution. Vinegar diluted with an equal quantity of water answers

well for this purpose, or acetic acid diluted with water to about the same strength may be used, if more convenient.

Within a few minutes the eschar begins to contract, and when the lid is released it is usually found that the tendency to entropion has been already overcome. A simple dressing may be applied if thought desirable; but it seems to be a work of supererogation, as the cases always do well without this precaution.

It is seldom necessary to repeat the application of the caustic, but this can be readily done if the effect of the first application has proved insufficient. Although at first there is considerable soreness and tumefaction of the lid this soon disappears, and after a few weeks all traces of the eschar have disappeared and it is usually not possible to detect that any operation has been performed.

A number of cases, especially cases of senile entropion, operated upon successfully in this manner might be related, but this would occupy unnecessarily the time of the Society. I may mention, however, that my associate, Dr. Reik, has recently operated in this way with complete success upon a case of entropion of the lower lids due to trachoma, in which Green's operation was required upon the upper lids, and that a few weeks since I operated upon a similar case with equal success, although in this instance a second application of the caustic was necessary.

In conclusion, I may emphasize the point that this method of operating is suited only to entropion of the *lower* lid. In entropion of the upper lid the tarsal cartilage, which is thicker and broader than in the lower lid, usually plays a more important part in the production of the deformity, and not much can be expected from any procedure which involves little else than the removal or a portion of the external integument.

ANOTHER CASE OF HÆMORRHAGIC GLAUCOMA,
WITH THE CLINICAL DIAGNOSIS OF
PREVIOUS THROMBOSIS OF THE
CENTRAL RETINAL VEIN.

[WITH MICRO-PHOTOGRAPHS.]

EXAMINATION BY ADOLF ALT, M.D., ST. LOUIS, MO.

CLINICAL HISTORY BY W. A. SHOEMAKER, M.D.,
AND J. ELLIS JENNINGS, M.D., ST. LOUIS, MO.

THE EYEBALL which forms the subject of the following paper I owe to the kindness of Drs. S. Pollak and J. Ellis Jennings.

Although the number of carefully examined eyes with the clinical diagnosis of hæmorrhagic glaucoma is growing, I do not think it is so large, that it should no longer be our duty to report every such case. The case to be described in the following pages differs in a number of particulars from the one I reported two years ago (see AMERICAN JOURNAL OF OPHTHALMOLOGY, Vol. XIV, No. 4), especially in some of the microscopical conditions. The eyeball, furthermore, was enucleated only about four months or more after the beginning of the disease, while in my former case the glaucoma was as yet a recent trouble at the time of enucleation.

The following are the notes on the clinical history of the case, as kindly furnished me by Drs. Shoemaker and Jennings. Dr. Shoemaker writes:

"Mrs. G., aged 36 years, came to see me on August 19, 1897. She had been suffering from 'heart trouble' for about one year. About seven weeks previously she went to Colorado on the advice of her physician. About six weeks previously, while walking in the streets of Denver, she noticed that vision in her left eye became suddenly poor. There was no pain.

"STAT. PRÆS. — L. E., slight ciliary injection. The pupil is slightly larger than in the R. E. and does not respond to light. V. = perception of light. The media were very dim, still I succeeded in making out extensive intra-ocular hæmorrhages. T. + 1?. My diagnosis was probable thrombosis of the central retinal vein.

"I ordered iodide of potassium and bichloride of mercury, but told her that vision was permanently lost, yet I would try to save the eyeball.

"By means of instillations of pilocarpine I kept her eye comfortable for about one month. After that she began to have pain in the eye and the tension became more increased. This condition was, however, variable. About this time I left for my vacation and she drifted into the hands of Dr. S. Pollak of this city."

Dr. Jennings writes:

"Mrs. G., aged 36 years, came to the eye clinic of the Mullanphy Hospital on November 23, 1897, complaining of severe pain in and around the left eye.

"HISTORY.—For the past fifteen years she has suffered from frequent attacks of rheumatism associated of late with heart complications, *i. e.*, pericarditis, endocarditis, and hypertrophy. Toward the end of June, 1897, she took a trip to the Pacific Coast, stopping over for a few days in Denver. While there she had a bilious attack, with fever, vomiting, dizziness and lightness in the head, and a sudden failure of vision in the left eye. Objects, especially those directly in front of her, appeared dim, and as if seen through a fog. There was no pain or redness of the eye. She continued her journey to California and after a visit of six weeks returned to St. Louis. Here, at the suggestion of her physician, Dr. T. A. Martin, she was seen by my friend Dr. Shoemaker, whose report is given above and who made the diagnosis of thrombosis of the retinal vein with extensive hæmorrhages scattered over the fundus.

"On October 28, the eye suddenly became inflamed and this was accompanied by violent pain so that the patient was unable to sleep. The pupil was dilated, T, + 2, but the anterior chamber was deep. A diagnosis of secondary glaucoma was made, and eserine instilled but with little or no benefit. She then drifted, and came to consult Dr. S. Pollak and myself at the Mullanphy Hospital on November 23, 1897.

"The eyeball was now very much injected, the pupil widely dilated, the anterior chamber shallow, the cornea dim, the media were hazy so that no fundus examination was possible. T. + 2. Heart very irregular. We ordered instillations of eserine, but as they did not relieve the symptoms, the eyeball was enucleated November 29."

When the hardened eyeball was cut in two it showed, on gross examination, plainly a deep excavation of the optic papilla. The region of the macula lutea was wrinkled and thickened, and had a mottled appearance due to whitish-grey and rust-brown spots (hæmorrhages). The whole of the retina as far forward as the ora serrata showed innumerable small roundish hæmorrhagic spots differing greatly in size and shape. The anterior chamber was reduced to about one-third of the normal by the angular adhesion of the iris periphery to the cornea; the lens was also pushed forward towards the abnormally situated iris. The vitreous body seemed clear and not tinged with blood.

I cut half of the eyeball into meridional, the other into æquatorial sections. The microscopical details are described in the following.

The corneal tissue proper shows no particular alteration, except at the limbus a small cell infiltration, which is especially marked around the conjunctival vessels and their corneal loops. The epithelium is slightly irregular, in places cells are wanting. Descemet's endothelium appears normal, except in a number of places where small accumulations of round cells are attached to it and protrude into the anterior chamber. These round cell nodules are mostly situated in the lower half of Descemet's membrane and just above the attachment of the iris. In their neighborhood the cells of the endothelium are proliferating, some showing two nuclei, some being changed into large round vesicular cells.

The iris periphery is firmly attached to the inner surface of the cornea, more so in the lower half of the eyeball, than in the upper half; in the former to about one-third of the iris-tissue. The attachment is plainly due to a newly-formed tissue between Descemet's membrane and iris, as has often before been described in cases of glaucoma. In our case the formation of such a tissue is still going on, particularly in the lower iris-angle and it spreads over the anterior surface of the iris to the pupillary edge forming several lamellæ. Here its contraction has produced a very broad ectropium uveæ, so that even the sphincter pupillæ is folded to some extent back on the anterior iris surface. (See Figs. 1 and 2). The blood vessels in the attached part of the iris are gorged with blood, while in the free part of the iris all blood vessels are empty and their

walls are considerably thickened and have undergone a hyaline metamorphosis. Schlemm's canal is obliterated in almost all of the sections, while in some there is still a small lumen filled with blood.



FIG. 1.

The ciliary body and processes are atrophic throughout, but more so in the lower half. The intra-muscular connective tissue is filled with round cells. The connective tissue of the ciliary processes is especially atrophied, yet their blood vessels (probably mostly veins) are gorged with blood. The peculiar dropsy or perhaps mucoid metamorphosis (see *AMERICAN JOURNAL OF OPHTHALMOLOGY*, Vol. XIII, No. 1) of the retinal layers of the ciliary body is in this eye much more developed than in the eye formerly described. In a number of places two and three adjoining ciliary processes have become adherent to each other and the resulting cyst-like round or oval

cavities are filled with these altered retinal cells, forming a solid mass of tissue, or they are only lined with one or more layers of these vesicular cells and contain a coagulated fluid. These same changes I have now seen so often in glaucomatous eyes, that it seems as if they were the direct result of glaucoma and caused by the pressure in the manner in which I tried to explain them in my paper, just referred to above.



FIG. 2.

The crystalline lens shows the beginning of the formation of cataract; changes which are, however, not characteristic of glaucoma and need find no place here.

The optic papilla is atrophied and deeply cupped (see Fig. 3), the lamina cribrosa being pushed back to a considerable extent. Some threads of newly-formed tissue are seen stretching from side to side within the cup. The optic nerve is atrophied throughout. The greatly thickened connective tissue trabecu-

læ show cell proliferation and infiltration. This inflammatory condition is most marked just where the nerve was cut off. The blood vessels, both arteries and veins are empty. The main stem of the central artery is very wide, while the vein as far as the specimen reaches shows nothing particular, more especially no thrombosis. The real pathological changes of the blood vessels of the retina begin just where the central blood vessels split up into their branches in the remnant of

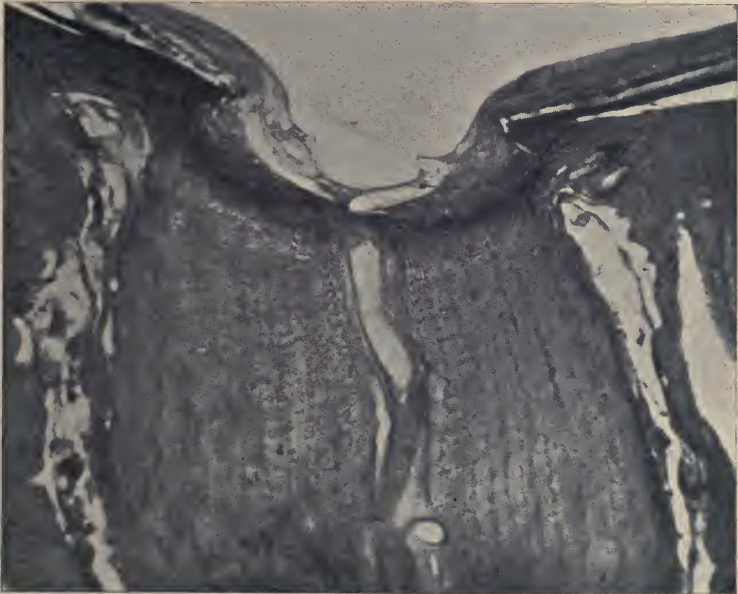


FIG. 3.

optic nerve tissue which forms the walls of the cup. From here on and throughout the extent of the retina the arteries have immensely thickened walls which are undergoing a hyaline metamorphosis. Some of these arteries and arterioles still have a lumen, which in places contains blood, in others is empty, yet I have found no signs of endo-arteritis. Most of the arteries, however, are closed altogether in consequence of the peri-arteritis. Just at their beginning in the cup and close to it, the larger branches, in spite of the great thickness of their walls, have an abnormally wide lumen, as if they were beginning to form aneurysmata.

The retinal veins proper are mostly empty and totally collapsed or the lumen is hardly visible. In a few of the larger branches, and especially in the space between the papilla and macula lutea, I found hyaline thrombi.

The hæmorrhages pervade the whole retina. They involve all its different layers and have in some places broken through the limitans externa and thus caused small hæmorrhagic detachments. There are the remnants of old hæmorrhages in regressive metamorphosis, hæmorrhages of a more recent date just becoming disintegrated and many apparently perfectly recent ones. Where I could find the ruptured vessel from which a hæmorrhage had started it was invariably an artery. I found no rupture of the limitans interna and consequent hæmorrhage into the vitreous body, although in the macular region it is detached and pressed inwards in folds.

The oldest and most extensive hæmorrhages were in the macula lutea and its immediate neighborhood. They were mostly represented by large cavities in the retinal tissue filled with fibrine and coagulated masses. In the fovea centralis a few fibrous layers were all that represented the former tissue.

Aside from the changes directly due to the actual or former presence of hæmorrhages in the retinal tissue, the rods and cones, the ganglionic and nerve-fiber layers show the most radical changes. The rods and cones are almost throughout disintegrated so as to be unrecognizable. The ganglionic cells have largely disappeared, particularly near the æquator and forward from it. The same change has taken place in the nerve-fiber layer, the nerve fibers having almost totally disappeared, so that Müller's supporting fibers are plainly visible and, in fact, are almost all the tissue left in this layer, especially near the æquator and forward from it.

The inner granular layer is throughout thinner than in the norm but varying in thickness and irregular in its arrangement. The outer granular layer seems to be of the normal thickness, but it contains (aside from still visible hæmorrhages) numerous oval and round spaces, where probably at some former time, small hæmorrhages had pushed its elements apart.

The venous blood vessels of the choroid are mostly gorged with blood, their walls hyaline and thickened, especially so at the posterior pole of the eye (and in the ciliary body). The arteries are mostly empty and collapsed. In one place near

the æquator I found a choroidal vein ruptured and the hæmorrhage causing a hæmorrhagic detachment of the retina.

The ciliary arteries in the little tissue which is attached to the external sheath of the optic nerve, show also a periarteritis and besides an endo-arteritis obliterans.

The eye, like the one first reported by me, was hypermetropic.

When comparing the conditions of this case with the ones in the case described previously by me, considerable differences are found. In the former case the vascular disease in the retina was almost confined to the venous blood vessels, while in the present case there was a wide-spread, almost total peri-arteritis and a thrombosis of some branches of the central retinal vein within the retina (see Fig. 4). Whether there was

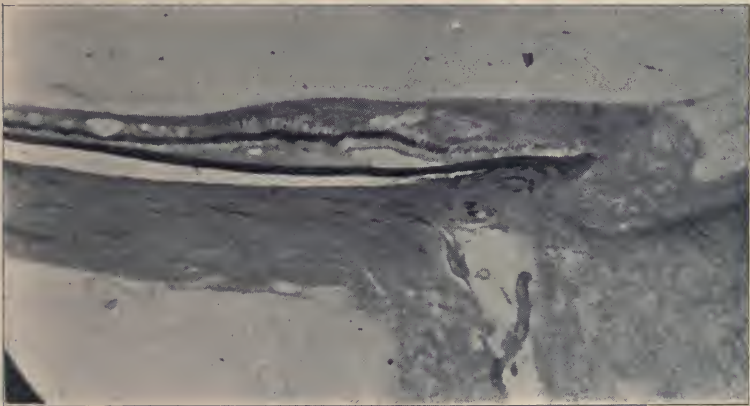


FIG. 4.

a thrombus also farther back in the main trunk of the central vein it is impossible to say, yet the cell infiltration at the very end of the excised part of the optic nerve makes this seem not improbable. The destruction caused in the retinal tissue by the hæmorrhages due to this universal vasculitis show nothing unusual. No direct rupture into the vitreous was found in this eye, although, at some time such has undoubtedly taken place. However, a vascular disease was also found in the choroid and in the posterior ciliary arteries, thus showing that in this case, at least, the whole vascular apparatus of the eyeball was in a pathological state.

The cup in the optic papilla in this case was very deep and unmistakable (See Fig. 3)

That at some time of the affection blood had entered the anterior chamber and clogged the filtration channels in the iris angle is evidenced by the conditions found in that part of the eyeball, as detailed above.

For further considerations on this form of secondary glaucoma following hæmorrhages in the retinal tissue, I must refer the reader back to my former paper on this subject (see AMERICAN JOURNAL OF OPHTHALMOLOGY, Vol. XIV, No. 4).

CASES FROM THE CLINIC.

BY HENRY DICKSON BRUNS, M.D., NEW ORLEANS, LA.,

PROFESSOR OF DISEASES OF THE EYE, NEW ORLEANS POLYCLINIC,—SURGEON-IN-CHARGE OF THE EYE DEPARTMENT, EYE, EAR, NOSE, AND THROAT HOSPITAL, NEW ORLEANS, LA.

CORNEAL ULCERS TREATED WITH FORMOL.

CASE 1.—A negress, aged 22 years, whose R. E. has been sore three weeks. General health and appearance is fair. Applied for treatment October 14, 1895, at which time she had a moderately severe kerato-iritis with marginal corneal ulcers. Atropine (gr. j to ʒj) was at once instilled and very frequent hot bathing at home ordered. V., R. and L., $\frac{20}{20}$.

October 15. Pupil fairly well dilated. No synechiæ. Atropine again instilled and a solution of formol 1 to 1000, followed by hot bathing, is ordered dropped in every hour.

October 26. Better. No iritis. Ulcers becoming vascular.

November 5. Looking well, but ulcers sluggish. Calomel insufflated every other day.

November 30. Cured. Duration of treatment, 47 days.

CASE 2.—A negro applied for treatment October 19, 1895. He is 29 years of age, robust, and thinks he got something in R. E. four days ago. V. of this eye, $\frac{20}{20}$. The foreign body is removed from the cornea under cocaine anæsthesia, the ulcerated spot scraped, and the use of a 1 to 1000 formol solution ordered every hour, followed by hot bathing.

October 22. After 4 days of treatment R. E. is well.

CASE 3.—A white man, aged 33 years, a sheet iron worker, whose general health is only fair. Had intermittent fever five or six months ago. Applied for treatment January 31, 1897. He thinks he got something in R. E. six days ago. There is a foreign body on the cornea causing acute kerato-iritis with hypopyon and V. = $\frac{30}{100}$ only. He has been using tea-leaf and milk and bread poultices. The foreign body is removed under cocaine, and a strong atropine solution is instilled, under which the pupil dilates evenly, and a 1 to 1000 formol solution, followed by hot bathing, is ordered for home use.

February 7. In 1 week the eye is practically well.

February 21. In 3 weeks is discharged, with V., R. E. $\frac{20}{30}$.

CASES OF NEURO-RETINITIS GREATLY BENEFITTED BY LARGE DOSES OF POTASSIUM IODIDE.

CASE 1.—A white man, aged 35 years, of feeble general health, and with a past history of syphilis, applied April 23, '95. V., R. E., $\frac{20}{50}$; L. E., $\frac{20}{200}$. Has neuro-retinitis with incipient optic atrophy. Given $\frac{1}{8}$ of a grain of mercury bichloride and 8 grains of potassium iodide three times daily. Ordered to be careful to keep mouth and teeth clean.

May 7. Increased potassium iodide to 12 grains t. i. d.

May 11. Feels better. Inunction of mercurial and bella-donna extract ointment on temples and forehead daily.

May 18. V., R. E., $\frac{20}{30}$; L. E., $\frac{20}{50}$.

June 6. Hypodermic use of strychnia begun.

June 15. V., R. E., $\frac{20}{20}$; L. E., $\frac{20}{30}$, doubtfully.

July 23. V., R. E., $\frac{20}{20}$; L. E., $\frac{20}{30}$, doubtfully.

CASE 2.—On May 4, 1895, a negress, aged 38 years, a child's nurse, applied at the clinic saying that her L. E. had been failing one year. V., R. E., $\frac{20}{20}$; L. E., fingers at 10 feet.

May 7. She was found to have neuro-retinitis, hæmorrhagic, L. E., and was put on potassium iodide, 10 grs., t. i. d.

May 11. Vision being practically unchanged, the dose was increased to 20 grains t. i. d.

June 3. V., R. E., $\frac{20}{20}$; L. E., $\frac{20}{200}$, and the dose was increased to 30 grains.

June 24. V., R. E., $\frac{20}{20}$; L. E., $\frac{20}{200}$. The dose was increased to 40 grains, but the patient disappeared.

CASE 3.—White man, aged 57 years, applied June 8, 1895. Sight failing in L. E. one month and a half. He has been hav-

ing bad colds with a cough of late. V., R. E., $\frac{20}{30}$; L. E., fingers at 9 feet. Ophthalmoscope shows neuro-retinitis, hæmorrhagic, of L. E., and potassium iodide, grs. 10, is ordered three times daily.

June 15. Condition is unchanged and the dose of potassium iodide is doubled.

June 22. V., R. E., $\frac{20}{20}$; L. E., $\frac{20}{100}$.

July 1. Potassium iodide increased to 40 grs. three times daily.

July 16. Increased dose to 50 grs. three times daily.

July 20. V., R. E., $\frac{20}{20}$; L. E., $\frac{20}{70}$. The patient never again returned.

PROMPT IMPROVEMENT IN INCIPIENT ATROPHY OF THE OPTIC NERVE UNDER FULL DOSES OF STRYCHNIA SULPHATE.

CASE I.—White man, aged 36 years, a reporter for a daily paper, came to the clinic April 4, 1895. Is anæmic and frail looking. His sight has been failing gradually of late. Several years ago he had a similar attack, which was cured. He is an intelligent man, aware of the nature of his malady, and says that there are several persons blind, he believes, from atrophy of the optic nerves, in his family. V., R. E., $\frac{20}{40}$; L. E., $\frac{20}{30}$; the optic discs are a pale bluish-white. Strychnia sulphate, gr. $\frac{1}{32}$, once daily, to be rapidly increased, is ordered.

April 13. Strychnia sulphate, gr. $\frac{1}{32}$, four times daily. V., R. and L. E., $\frac{20}{30}$.

April 30. V., R. E., $\frac{20}{20}$ well; L. F., $\frac{20}{20}$ fairly.

May 11. V., R. and L. E., $\frac{20}{20}$ well.

May 25. The improvements holds; V., R. and L. E., $\frac{20}{20}$ well. To take gr. $\frac{1}{32}$ strychnia sulphate twice daily for a month yet. The patient did not alter his habits or employment and nothing except the strychnia was given.

ALBUMINURIC RETINITIS WITH GREAT IMPAIRMENT OF VISION; GREAT AND RAPID IMPROVEMENT UNDER SIMPLE TREATMENT.

CASE I.—White man, aged 48 years, presented himself at the clinic January 18, 1895; says his general health is good; that two years ago, in South America, he become suddenly blind, without cause, so far as he knows. His sight has come

gradually back to the present point; V., R. and L. E., $10/300$. The ophthalmoscope reveals typical albuminuric retinitis, and a specimen of his urine is sent to the pathological department. The department reports: Reaction, acid; specific gravity, 1012; granular casts and 5 per cent. (by bulk) of moist albumen. The man in no way resembles a Brightic patient, but a gloomy prognosis is made. Five grains of potassium iodide and $7\frac{1}{2}$ minims of tincture digitalis are ordered, to be taken three times daily.

February 18. V., R. and L. E., $20/50$.

March 4. V., R. and L. E., $20/30$. Feels so well that he takes his leave, 46 days after treatment was begun. During this time he has had no work to do; could live well, following a good régime, and drinking water copiously.

TIME REQUIRED FOR RECOVERY IN SEVERE TOBACCO AMBLYOPIA.

CASE I.—White man, stone-cutter, aged 47 years. Eyes have been weak two months. General health good, but uses tobacco to great excess. Came to clinic May 10, 1898. V., R. E., $20/100$; L. E., $20/400$. Ophthalmoscope shows the temporal sides of discs to be pale. Ordered total abstinence from tobacco.

June 11. V., R. E., $20/50$; L. E., $20/200$. Put on gr. $1/32$ of strychnia once daily.

June 22. No change in vision. Strychnia increased to gr. $1/24$ twice daily.

July 5. V., R. and L. E., $20/40$; O. U., $20/30$.

July 18. V., R. E., $20/20$; L. E., $20/50$. Strychnia now discontinued for two weeks.

August 9. V., R. and L. E., $20/50$. Strychnia resumed.

September 9. V., R. E., $20/30$; L. E., $20/40$. Discontinued treatment.

October 14. V., R. E., $20/20$ fairly; L. E., $20/30$ fairly. Practically well. Time required for recovery, 5 months.

PHLYCTENULAR OPHTHALMIA — "PHLYCTENULE EN PLAQUE."

CASE I.—Negro school-boy, aged $13\frac{1}{2}$ years, come to the clinic May 7, 1894. Complains of burning and lachrymation when reading, for the last few days. V., R. and L. E., $20/20$. The eyes are much injected and instead of discrete phlycten-

ulæ there are *plaques* of infiltrated material slightly elevating the conjunctiva of the R. E. outwards and downwards, and in the L. E. inwards and downwards. These *plaques* are of a uniform red color, marked with larger blood vessels, and might be compared in appearance to inflamed pterygia. Here and there on the elevated area are points of superficial ulceration exactly like the ordinary phlyctenules at a late stage. For two weeks calomel is dusted into the eyes every other day and then yellow oxide of mercury salve, and hot baths are used twice a week. In 42 days the patient was dismissed cured; V., R. and L. E., $\frac{20}{20}$.

CASE 2.—A negress, aged 22 years, came to the clinic on June 22, 1894. V., R. E., $\frac{20}{70}$; L. E., $\frac{20}{50}$. Her R. E. had been sore three weeks. On the horizontal meridian of this eye, both inwards and outwards, bordering upon and coming up to the corneal margin, are two large *plaques* resembling the infiltration of episcleritis, but more florid in hue. The edge by which they border upon the cornea elevated about 2 mm. and concave. There is a swollen lymphatic gland on the left side of the neck. Yellow oxide of mercury salve once a day and hot applications four times daily are ordered. In a short time she quit, almost perfectly well.

CASE 3.—A negro, aged 25 years, came to the clinic July 23, '94. His appearance is scrofulous and he had a similar attack five months ago. His R. E. has been affected only a few days. V., R. E., $\frac{20}{100}$; L. E., $\frac{20}{15}$. This is a severe case. The eye is greatly injected and there is infiltration *en plaque* almost entirely around the cornea. He is ordered atropine, yellow oxide of mercury salve and bathing with hot borax water daily. Unfortunately this patient never returned.

This condition of infiltration of phlyctenular material *en plaque* I have only observed in negroes, but in them frequently, and have not seen described in any of our text-books. The subjects are usually very "scrofulous" and the local symptoms severe. Ulceration takes place over areas, as a rule, no larger than the common discrete phlyctenule, though sometimes apparently by coalescence the area is two or three times as large. Upon superficial observation it might be confounded with the spring catarrh of the continental writers, but only before ulceration has set in. The disease seems to yield as readily to mercurials, locally applied, as any severe case of phlyctenular

ophthalmia, a malady to which the negro race is peculiarly susceptible. In this race I have seen phlyctenular ophthalmia in much severer forms, more persistent in relapsing, more destructive in effect, and at a more advanced age than I have in the white.

DETERIORATION OF CENTRAL VISION IN INTERNAL CONCOMITANT STRABISMUS WITH RETURN TO THE NORMAL AFTER STRABOTOMY.

CASE I.—A white school-boy, aged 9 years, came to the clinic July 9, 1894. V., R. E., $\frac{10}{200}$; L. E., $\frac{20}{15}$. Has an internal concomitant squint of R. E. Thinks he has been "permanently" cross-eyed for two years. Before that he only squinted at times. General health good.

July 26 Right internal muscle divided under cocaine. Correction not quite complete.

September 24. V., R. E., $\frac{20}{40}$. Eyes still converge.

September 26. Divided left internal rectus under cocaine. Correction perfect.

September 27. V., R. E., $\frac{20}{30}$.

October 22. Discharged cured. V., R. and L. E., $\frac{20}{20}$.

The interest of this case depends not only on the improvement in vision of the right eye, for this not infrequently occurs after strabotomy, though the degree of improvement is seldom so great, but upon the fact, of which the senior assistant is perfectly confident, that the vision of the right eye deteriorated during the time that the boy had, to use his own language, a "permanent" squint of this eye. Two years before his admission to the clinic, this boy was examined by Dr. Jowers, who is sure that his vision in each eye was $\frac{20}{20}$ at that time.

RUPTURES OF THE CHOROID.

CASE I.—White boy, aged 10 years. Was struck on right eye one month ago. V., fingers at 6 feet. Ophthalmoscope shows a large, partial tear of choroid immediately to the outer side of the optic nerve and another large tear completely through the choroid in the macular region.

CASE 2.—A white, German laborer, aged 47 years. Nine years ago he received a heavy blow directly *between* the eyes and ever since his right eye has been poor; V., $\frac{20}{40}$. With the ophthalmoscope a rupture of the choroid is observed.

CASE 3.—White man, aged 26 years. About twelve years ago he was struck on nose and right eye with splinter of wood. For three years he has had attacks of pain, one or two a month, worse in summer and in the daytime over the right eye. He "blows big scabs from the right nostril." He believes the sight of right has been bad "as long as he can remember." V., R.E., fingers at 9 feet. Ophthalmoscopic examination reveals a large rupture of the choroid in the macular region.

COLOBOMA OF THE CHOROID.

CASE 1 — A white school-girl, aged 10 years, of good general appearance and health. One year ago, she says, she began to notice she could not see well with right eye. Vision of this eye is now only fingers at 6 inches. Examination of fundus through the dilated pupil shows an unmistakable coloboma of the choroid of large size extending down and outwards from the optic nerve almost to the equator of the globe. Just above the end of the coloboma and close to the macula is another round hole in the choroid about the size of the optic disc. The condition must have been congenital, yet the child noticed the almost total blindness of this eye only one year ago.

ATROPHY AND FATTY DEGENERATION OF THE RETINA FOLLOWING MALARIAL RETINAL HÆMORRHAGE.

CASE 1.—A negro farmer, aged 27 years. Two years ago he had malarial chills and fever and his eyes became suddenly blind. His general health is now good and his vision is reduced to l. p. O. U. Ophthalmoscopic examination shows very plainly an atrophic state of the retina with small white patches here and there in its substance which seemed to me areas of fatty degeneration. From the clear history of the malarial attack and the sudden onset of the blindness I can not but conclude that the present condition is due to malarial hæmorrhage into the retina. The case is of great interest to me, because I have never before seen such complete blindness produced by this disease. I have long been interested in this particular effect of the malarial poison and as far back as 1883 (*New Orleans Medical and Surgical Journal*, December), and 1888 (*Medical Record*, July 14), published articles upon the subject narrating illustrative cases. As a rule, the blindness

produced is moderate in degree, unless the hæmorrhage be situated exactly at the macula, its duration short, and the recovery very complete. For these reasons it is seldom that we have the opportunity to examine the effect produced in the retina so long after the occurrence of the hæmorrhage. Strange to say this form of retinitis is not mentioned in the text-books of either Norris and Oliver (1893) or Fuchs (1892), but Noyes (1890) mentions it, citing the observations of Kipp. The pathology seems to be related to leukæmia and pernicious anæmia rather than to malarial hæmaturia, although I have never had the opportunity of examining the eyes in the latter condition. The hæmorrhages are almost always rounded (in deep layers) not feathery.

REMOVAL OF THE LENS IN HIGH MYOPIA.

CASE I.—White school-girl, aged 12 years, of good general health, came to the clinic January 14, 1895. She can not see well unless she brings things very close. Can not tell when she first noticed this. Has had glasses, but they did not give satisfaction. V., R. E. = $\frac{4}{200}$ with — 20 D. s. = $\frac{20}{50}$; L. E. = $\frac{5}{200}$ with — 18 D. s. = $\frac{20}{50}$ doubtfully. Ophthalmoscope shows pronounced conus each eye. She was placed in charge of one of the assistant surgeons who gave potassium iodide gr. 10 t. i. d., and advised removal of the right lens.

January 25. Atropine in right eye.

January 30. Pupil well dilated; the surgeon broke up the right lens thoroughly with a needle under cocaine anæsthesia.

January 31. Little reaction and no pain. Lens thoroughly broken up and opaque. Atropine instilled and ordered to be used twice a day at home. Tn.

February 6. Tn. Very moderate circumcorneal injection. Lens being absorbed above and below.

February 13. Same surgeon removed two-thirds of lens substance with Lippincott's syringe, but lost a little vitreous in so doing. Atropine and bandage.

February 14. Bandage very loose. Wound healed, but shred of vitreous in the wound. Eye painful last night. Atropine and bandage.

February 15. Iritis with hypopyon. No pain. Removed shred of vitreous. Ordered atropine and hot bathing every hour.

March 26 Eye too soft and flushing readily. Pupil occluded and iris drawn towards incision made February 13.

April 18. Free iridotomy. Anterior chamber filled with blood.

May 5. Blood not quite absorbed; iridotomy closed. For two days after the last iridotomy the eye was very painful.

July 8. Dr. Bruns made iridotomy down and inwards, at right angles to stretched fibers of iris, with von Graefe knife, under chloroform anæsthesia.

July 9. Little blood in anterior chamber, little reaction, and no vision.

July 21. A small opening in the iris remains, but there is still some obscuring membrane behind it.

August 5. A second and more extensive iridotomy at same spot, discising the obstructing membrane and enlarging the coloboma, is made, under chloroform, by Dr. Bruns.

August 6. Anterior chamber filled with blood. Ordered frequent hot baths.

August 13. Blood beginning to clear away.

August 24. Blood has disappeared. No vision.

September 8. No blood in anterior chamber. The false pupil, situated down and inwards, almost round and about $\frac{2}{16}$ of an inch in diameter, looks clear. $V.=\frac{6}{200}$.

October 29. $V., R. E.=\frac{15}{200}$ with $+ 3 s.=\frac{20}{50}$.

January 2, 1897. $V. R. E.=\frac{20}{200}$; $L. E.=\frac{10}{200}$; $R. E.$ with $+ 3 s. \text{ C} + 3 c. ax. 105^\circ = \frac{20}{50}$. She can not read with this eye (right) with any glass at any distance; however, $L. E.$ with $- 3 s.=Sn. No. 1$ at 8 inches. Therefore she is ordered $R. E.$ with $+ 3 s. \text{ C} + 2.50 c. ax. 105^\circ$ for far; $L. E. - 3 s.$ for near.

January 7. Glasses satisfactory. $R. E.=\frac{20}{50}$; $L. E.=\frac{10}{200}$. Can read $Sn. No. 1$ at 8 inches with left eye.

This case seems noteworthy because:

1. It is the first of the kind reported from the far South, I believe.

2. It is evident that the operator made too free a discision at the first operation. In all such cases the first operation should be slight and tentative.

3. It was a mistake to have become impatient over the progress of absorption after the lapse of fifteen days only. The loss of an essentially healthy eye, having highly useful vision, as the result of an operation intended to improve that vision,

must be regarded as an unmitigated misfortune. In such a case the element of time should be allowed no consideration; the safest, and only the safest method, is to be followed. There is no doubt, I believe, that discision is far safer than any of the methods of extraction, and so long as absorption is progressing favorably no effort at extraction, either with or without suction or washing, should be undertaken. It is to be remembered that in these cases in which one or more discisions have been made, the posterior capsule has, in all probability, been either penetrated or ruptured, and a corneal incision is almost sure to invite prolapse of the vitreous. In this case the posterior capsule was evidently intact as no prolapse followed the incision, but in using the Lippincott syringe the operator in an unguarded moment allowed the nozzle to press too far backwards and so caused the loss of vitreous. Great care must be taken in washing out cortex with this instrument to keep the point of the nozzle against the posterior surface of the cornea and allow the regurgitating fluid to do the work.

4. The three iridotomies made before success was obtained shows how much may be done in such cases by cautious perseverance and insistance. The failure of the first was due to its not being made at right angles to the direction of greatest tension. The second and third were made by what, for lack of a better name, I and my assistants have been wont to call the "somerset operation," elsewhere described. The first operation failed because the opening was too small and a fine, false membrane (fibrin?) spread itself over the new pupil. The field of operation was small and the execution of the manœuvre very difficult, but the last operation was successful by piercing and cutting the false membrane and by so enlarging the artificial pupil that the fibrin of the extravasated blood was not able to bridge it over and give rise to a new membrane.

The very slow progress of such cases and the patience that must often be exercised in conducting them to a successful termination is well illustrated by the course of this case after the last iridotomy. It was twenty days before the blood was completely gone from the anterior chamber; thirty-four days before any vision was obtained, and eighty-five days before the final result, $\frac{20}{50}$, was had. We could never get the patient to read any ordinary sized print, at any distance, with any glass, before the operated eye, though with — 3 s. before

the unoperated one she read Sn. No. 1 at 8 inches; nor could we account for the phenomenon.

The operation for the removal of the lens in high myopia seems to me a most reasonable one and one that time and a greater accumulation of experience should prove a most beneficent one. The progress of high myopia is, the pathological basis aside, according to all our theories, dependent upon the excessive use of the longitudinal fibres of the ciliary muscle or the excessive use of the extrinsic muscles in convergence; probably upon both. Removal of the lens at once abolishes accommodation and by suitable lenses we can remove the near point to any distance that we please and so render the effort of convergence much less violent. In the case of a person with extreme myopia in one eye only, the other being but moderately affected, lenses which fully correct the defect of each eye are so dissimilar as to be unsatisfactory, ill-balanced, intolerable. By removal of the lens from the ultra-myopic eye, lenses of much the same strength can be used, general excellence of vision is much increased and comfort greatly promoted. In such a case the patient will depend for near vision on the myopic eye, or a pair of spectacles can be arranged for near work in which the near point of the aphakic eye is made by means of a convex lens to correspond with that of the moderately myopic one.

SOCIETY PROCEEDINGS.

BRITISH MEDICAL ASSOCIATION.—SECTION OF OPHTHALMOLOGY.

MEETING HELD IN EDINBURGH.

After the President (Dr. Argyll Robertson) had opened the Section of Ophthalmology with an address, Professor Nuel (Liège) read a paper on "The Absorption of Aqueous Humor by the Iris." He pointed out by the aid of diagrams the presence of lymphatic channels in the iris of the dog and cat. Indian ink was injected into the vitreous of the eyes of these animals and the passage of the ink traced into canals in the iris. By staining with silver nitrate he had found canals and stomata, the canals increasing in size towards the ligamentum

pectinatum. He applied the results of these experiments to the causation of glaucoma, and pointed out that iridectomy opened up the channels. Mydriatics also had the same effect, thus increasing the flow from the eye. Professor Nuel then showed lantern slides illustrative of his paper.

Dr. Berry (Edinburgh) made some remarks on the result of the injection of chlorine water into the vitreous in septic cases.

Professor Nuel, in reply, stated that absorption took place from the anterior surface of the iris, and this was the principal area of absorption in the eye.

Dr. Reid (Glasgow) next showed some lantern specimens illustrative of reparative processes following wounds of the cornea, and specimens of the intercalary cells met with in the cornea.

Dr. George Mackay and Dr. J. C. Dunlop (Edinburgh) then read a paper on "A Case of Acquired Color-Blindness," which came on suddenly in a patient suffering from cancer of the stomach. The patient's vision was good, media clear, refraction emmetropic, fields of vision good to hand movements, but restricted to more accurate measurement. Five months after the color-blindness came on the patient died. The post-mortem examination revealed cancer of the pylorus and atrophy of the posterior end of the occipito-temporal convolution of the right occipital lobe, with general shrinkage of the right occipital lobe. On section the left occipital lobe was found slightly affected and the arteries and capillaries extremely thickened. Lantern specimens of the brain and arteries were then shown.

Dr. Berry (Edinburgh) spoke on the difficulty of proving the existence of a color center apart from a center of form, the form-sense and color-sense being closely associated.

Dr. M'Kenzie Davidson (London) gave a demonstration on the employment of Roentgen rays in ophthalmology. He had used them in forty-one cases of foreign body in the orbit with satisfactory results. He showed the apparatus he used, and gave a demonstration of his methods on a patient. His principle was based on getting three co-ordinates of a point; the three planes were formed by two knitting needles fixed on the apparatus, one vertical, the other horizontal crossing one another, and by the photographic plate. The patient's

head was fixed, the axis of his eye being parallel to the horizontal needle. A fine Crookes' tube was used in two positions, 6 cm. apart, the two plates thus obtained being afterwards placed in stereoscopic relief. A piece of lead wire was previously placed on the patient's lower lid to form a known point from which the position of the foreign body could be calculated. This was worked out by means of a separate apparatus. A number of lantern slides illustrative of the apparatus and of skiagraphs were then shown.

Mr. Treacher Collins (London) showed a number of lantern slides illustrative of foreign bodies in the eye, which had been localized by Dr. M'Kenzie Davidson by skiagraphy, and afterwards successfully removed. He advocated the early use of the rays in all cases of suspected foreign bodies in the eye.

Mr. Cargill (London) mentioned five cases in which Dr. M'Kenzie Davidson's method had proved of great value in deciding the presence, situation, or absence of foreign bodies.

Dr. Reeve (Toronto) showed an apparatus made by Dr. Sweet (Philadelphia), and Professor M'Hardy (London) spoke of two cases in which skiagraphy had proved most important.

Dr. Hinshelwood (Glasgow) read a paper on "Holocaine," and advocated its use as an anæsthetic in eye work; it acted more rapidly than cocaine.

Mr. Edgar Browne (Liverpool) said that he used it in all superficial operations, as it had no harmful action on the cornea.

Dr. Argyll Robertson said his experience led him to consider that holocaine was much inferior to cocaine, but Dr. Hinshelwood said that he believed that most cases of failure were due to imperfectly prepared solutions.

Dr Leslie Buchanan (Liverpool) then showed some specimens of leucosarcoma of the choroid.

Professor Snellen (Utrecht) gave a "Historical Review of Operative Treatment of Strabismus" from the first operation by Professor Dieffenbach in 1839 onwards. He compared the operations of von Graefe and of Priestley Smith, and described the operation he himself had adopted. He emphasized the importance of producing as little injury to surrounding tissues as possible, thus preventing subsequent cicatrization and shortening of the muscle. He advocated removal of a portion of the tendon in many cases. Chloroform should not be used, but a local anæsthetic, as cocaine.

A discussion ensued, in the course of which Dr. Little said that he did not fully correct the squint at the time of operation. At the same time, he laid stress on the importance of the use of glasses, especially in young children.

Dr. Berry said he believed that cases of insufficiency after tenotomy were due to too free division, to a less extent the following cicatricial contraction might be a cause.

Dr. Argyll Robertson drew attention to Mr. Critchett's operation in cases where divergence had resulted from previous operation.

Professor Snellen replied, advocating the use of glasses, and the undesirability of any operation in very young children.

Mr. Lawford read a paper on an operative procedure for cases of incarcerated iris. This consisted in passing a Graefe's knife through the margin of the cornea into the anterior chamber and out at the opposite side. He then divided the iris on each side of the adhesion.

Dr. Argyll Robertson preferred operating twice.

Professor Snellen said he considered the principal object of operating was to reduce tension. He performed sphincterotomy instead of iridectomy.

Dr. Berry thought that in the majority the tension was not increased. He did an iridectomy opposite the scar, or a double iridectomy one each side of the adhesion.

Dr. Little performed iridectomy as for glaucoma in all bad cases.

Mr. Lawford, in reply, expressed the opinion that the reduction of intraocular tension was the most important point.

Mr. R. Williams then read a paper on "A Case of Paralysis of Accommodation After Influenza." Each eye was affected, the left first.

Dr. Argyll Robertson said he had seen two similar cases which followed influenza, but he could not say that influenza had been the cause.

Mr. Juler mentioned cases of paralysis of the third nerve after influenza with complete recovery, and Dr. George MacKay several cases of unilateral paralysis of accommodation after influenza. One case was very persistent, but was temporarily relieved by eserine.

Mr. Edgar Browne said that paralysis of the third nerve after influenza was less rare than paralysis of the sixth and the optic nerve.

Mr Granger spoke of a patient who had not recovered from the paralysis.

Dr. Tatham Thompson read a paper on "A Case of Cyst of the Hyaline Canal Producing a Double Lens;" and Dr. Angus M'Gillivray read a paper on "The Hyaloid Canal and Its Relation to Cyclitic Exudation."

A paper on "The Diplo-Bacillus and the Conjunctivitis it Caused" was read by Dr. J. W. Eyre, and one on "The Bacteriology of the Normal Conjunctival Sac and Its Bearing on the Use of Antiseptics" by Mr. Arnold Lawson. He found many sacs free from organisms; out of 159 cases, 118 contained the bacillus xerosis. The pyogenic cocci were few, and when injected into the conjunctival sacs of guinea-pigs produced no reaction. He advocated asepsis. Dr. Eyre considered that the upper portion of the conjunctival sac was sterile, the lower part not so.

Dr. Juler (London) read a paper on "A Case of Symmetrical Gumma of the Ciliary Body, With Recovery of Vision," and reviewed the literature, pointing out the rarity of intra-ocular syphiloma.

Dr. Argyll Robertson said he had seen a number of cases in which the astigmatism produced had subsequently almost entirely disappeared, and Mr. Hill Griffith said that he had seen vision entirely destroyed in several cases. Mr. Juler replied.

Mr. Juler then read the second part of his paper on "A Case of Interstitial Keratitis, With Acquired Syphilis."

Dr. Hinshelwood and Mr. Lawson mentioned similar cases, and Dr. Argyll Robertson said he thought a distinction should be drawn between the characteristic cases of interstitial keratitis and cases of keratitis punctata. He considered that Mr. Juler's case belonged to the latter category.

Papers were also read by Mr. J. Fallows, Mr. H. E. Jones, Mr. Chas. Wray, Mr. John Griffith (London), and Dr. Adolph Bronner (Bradford).

Dr. M'Gillivray said that in America a solution of extract of suprarenal capsule had been used with cocaine to prolong the anæsthesia. He had tried it in one case with good results.

Dr. Reeve (Toronto) said suprarenal extract acted as a styptic as well, and rendered the operation a bloodless one.

THE AMERICAN JOURNAL OF
OPHTHALMOLOGY.

VOL. XV.

NOVEMBER, 1898.

NO. II.

ORIGINAL ARTICLES.

ADENOMA OF THE CILIARY BODY SPRINGING
FROM THE PAR SCILIARIS RETINÆ.
FOUR CASES.

[WITH MICRO-PHOTOGRAPHS.]

BY ADOLF ALT, M.D., ST. LOUIS, MO.

AMONG material for microscopical study which I obtained last winter from the dissecting room of the Beaumont Hospital Medical College were the two eyes of an old man who had died from croupous pneumonia. No previous history was obtainable, especially as regards his vision. All I could learn was, that while in the hospital he had not complained of his eyes.

I cut the anterior half of the right eye into æquatorial sections and found in the ciliary body, involving the root of one ciliary process, a microscopical tumor. I had never previously seen anything like it, and, as far as I knew, nothing similar had ever before been described. A little later on I examined the left eye of the same man and also cut the anterior half into æquatorial sections. To my astonishment I found in this eye, also, the same kind of tumor, involving only one ciliary process, but situated, at its farthest projection into the interior of the eyeball which rendered it visible to the naked eye, although

it was very small. Otherwise, both eyes were, in general, normal.

The strange coincidence of two isolated tumors, each in a single ciliary process, in the two eyes of one and the same individual, led me to examine numerous similar sections of my collection, thinking that such tumors might on account of their smallness have, perhaps, escaped my eye on former examinations and might occur in a larger number of eyes. This research proved, however, unsuccessful.

A few months later I had occasion to remove the right eye of an elderly gentleman on account of a sarcoma of the conjunctiva which spread into the cornea. On examination I found in this eye such a tumor, microscopical in size and also involving but one ciliary process at its farthest projection into the eyeball. Except for the conjunctival tumor, this eye was otherwise perfectly normal.

About the same time I received parts of a number of pathological eyes through the kindness of a colleague. Among these was half of an eye enucleated on account of traumatic acute purulent panophthalmitis. In this eye, also, I found the same kind of tumor which lay in the root of one ciliary process.

This astonishing experience of finding in so short a period, and among comparatively few eyeballs examined by me during this time, this same kind of tumor in four eyes, is the more striking, since in all the many eyeballs which I have previously and since examined, I have seen nothing similar. Yet, not only in my own experience, but also in the recorded experience of the numerous workers in the field of the histo-pathology of the human eye this particular form of tumor has apparently so far not been met with.

Especially the fact, that one individual had such a tumor in either eye gave me the idea that these tumors might, perhaps, represent a small organ which, having existed in the eyes of animals of a lower order, had lost its function and disappeared in man in general, but might recur here and there; or, perhaps, that such an organ had existence and a certain function in the foetal eye, but became atrophied later on and had, perhaps, remained persistent in the four eyes under consideration through adult life. Reiterated research through the literature at my disposal and my specimens of animals' and foetal eyes of man, has, however, furnished me with no foundation

for such an assumption. The only structures which might, perhaps, be mentioned in this connection are the tumor-like pigmented excrescences springing from the pupillary edge of the iris of the horse. I must leave this question open for further research. The almost absolute similarity of the four tumors, under consideration, as regards the tissue involved as well as their histological origin and composition, is certainly very startling.

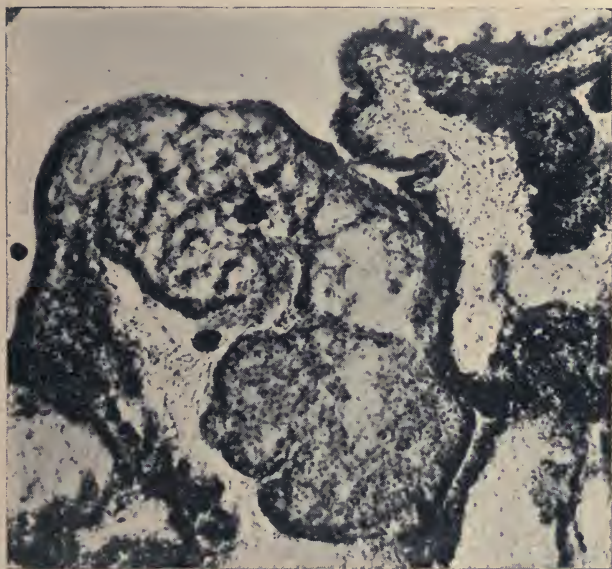


FIG. 1.

The first tumor of which I possess thirteen slides, which may indicate its thickness in an antero-posterior direction, lies at the base of a ciliary process, starting small in front of the pars non-plicata of the ciliary body, then widening out considerably, and ending again small at the apex of the ciliary body behind the root of the iris. While its posterior and anterior extremities have an oval or roundish outline, its central and thickest portion is rather bean-shaped and is almost lobulated. (See Fig. 1).

The pigmented epithelium layer surrounds it on all sides and this, together with the tissue of the ciliary process to which it is attached, is pressed aside. Outside of the pigmented

epithelium towards the interior of the eye, lies a continuous cover of one single layer of cells, the pars ciliaris retinæ.

The tumor itself consists of cells and a coagulated amorphous substance. The cells are apparently the same as those of the pars ciliaris retinæ. In parts these cells are unmistakably arranged in parallel rows around a very small central lumen, like glandular tubules, and these tubules form numerous convolutions. In other parts the amorphous substance intervenes

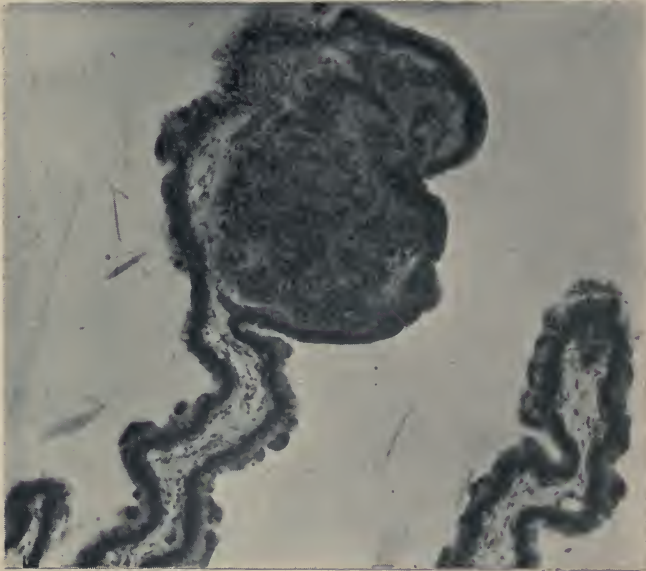


FIG. 2.

and presses these cells and cell tubules apart, sometimes to a very great extent. Many cells appear flattened by pressure. The whole picture at once suggests that which a gland represents when after closure of its efferent duct the process of secretion goes on and leads to gradual distention of its ducts and consequent flattening and atrophy of the secreting cells. Such compressed and flattened cells in this tumor often appear like spindles resembling connective tissue or myxomatous cells, but I think I am correct in the opinion that all cells constituting this tumor are of epithelial origin and character and are derived from the cells of the pars ciliaris retinæ.

This opinion is more particularly strengthened by a con-

dition found in the second tumor. This tumor occupies the very extremity of a single ciliary process and is considerably thinner than the former tumor in an antero-posterior direction. It does not reach the apex of the ciliary body forwards, and starts considerably in front of where the pars plicata begins. Like the first tumor it lies on one side of the tissue of the ciliary process which it involves and this tissue is pressed aside. While, however, in the first tumor the pigmented epithelium

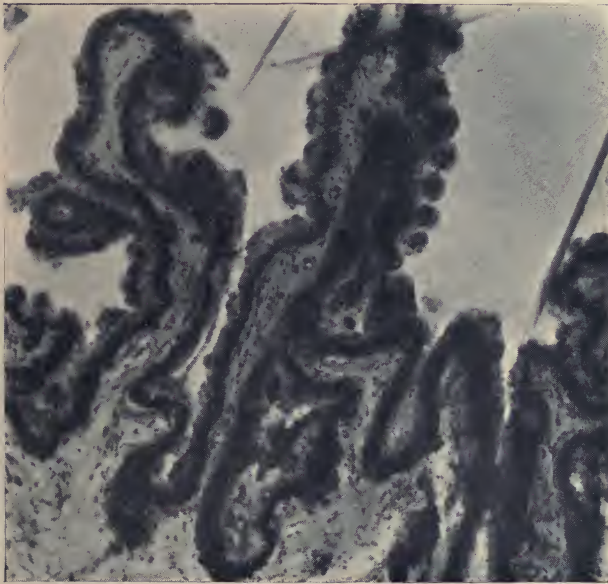


FIG. 3.

was also pressed inwards by the tumor, in the present one this is not the case. (See Fig. 2). This second tumor is only covered over on the free surface by the pigmented epithelium and outside of this by the pars ciliaris retinæ, excepting in one place where there is a small gap in the pigmented epithelium, forming something like the hylus of a gland, and through this gap, the pars ciliaris retinæ has grown inward to form the tumor. What is left of the tissue of the ciliary process appears quite normal and contains blood vessels which are partly filled with blood. There is nowhere a separate tumor capsule and no zone of cell infiltration around the tumor as we see it in

cases of malignant newformation, in this or any of the four tumors.

The tumor consists of cell tubules and interposed coagulated amorphous substance just like the first one. The process of probable secretion and consequent distention is, however, much less developed.

The thickness of this tumor may be indicated by the fact that I have but nine slides of it.

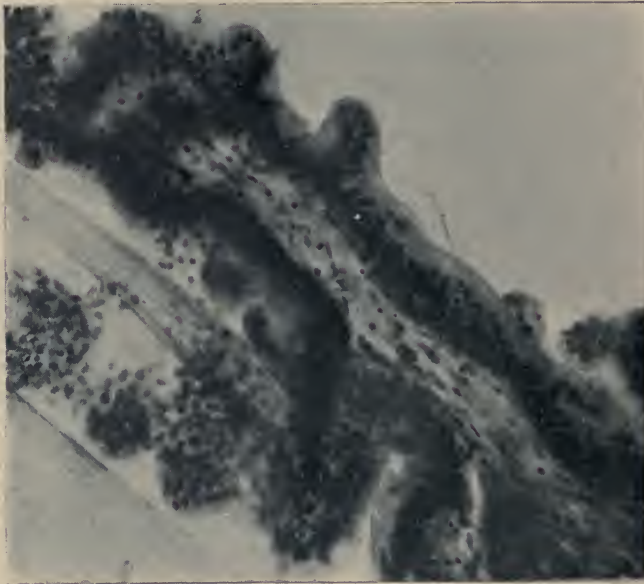


FIG. 4.

While, in a general way and aside from these tumors, both these eyeballs were apparently normal (except for a beginning cataract in the right one) they both show another peculiarity affecting the pars ciliaris retinae throughout, which may or may not have some connection with the origin of these tumors which I have, however, met with in other eyes.

While in a general way the cells of this layer form the well-known cover of the ciliary body of one uniform row of cells, there are added to it innumerable bud-like projections springing from this layer towards the interior of the eyeball. (See Fig. 3). These bud-like projections consist of three or four and sometimes a great many more cells, clustered together

and presenting a rounded surface toward the interior of the eye. In quite a number of them there is a decided tendency to a parallel arrangement of the cells (see Fig. 4), and an apparent lumen, yet I have never found a real one. These buds, therefore, appear very much like the bleached so-called glands of the ciliary body of E. Treacher Collins, which are pegs of pigmented cells springing from the pigmented epithelium layer and growing outwards into the tissue of the ciliary body, while the buds, here described, are unpigmented, spring from the pars ciliaris retinae and project free into the interior of the eye, the pigmented epithelium layer being normal in appearance.



FIG. 5.

The third tumor (see Fig. 5) is the smallest of the four and I have only six slides of it. Like the second tumor, it occupies almost the extremest tip of one ciliary process. It also has a deep hylus where the cells of the pars ciliaris retinae have grown inward. The tumor is like the first one, totally surrounded by a pigmented epithelium layer which with the tissue of the ciliary process is pressed aside. There is no break in the pigmented epithelium layer, it is simply doubled back. There is no zone of cell infiltration.

The histological elements of this tumor differ from the previous two in no particular, yet in this tumor the quantity of amorphous substance is even less than in the second one and consequently it appears comparatively much more solid. It is probably younger than the others.

The fourth tumor (see Fig. 6) is the largest of them all. It, also is confined to one ciliary process. I possess only 11 slides of this, but quite a number were lost. In this tumor the cells and cell cylinders form the smaller portion, the amorphous coagulated substance being much greater in quantity than in any of the

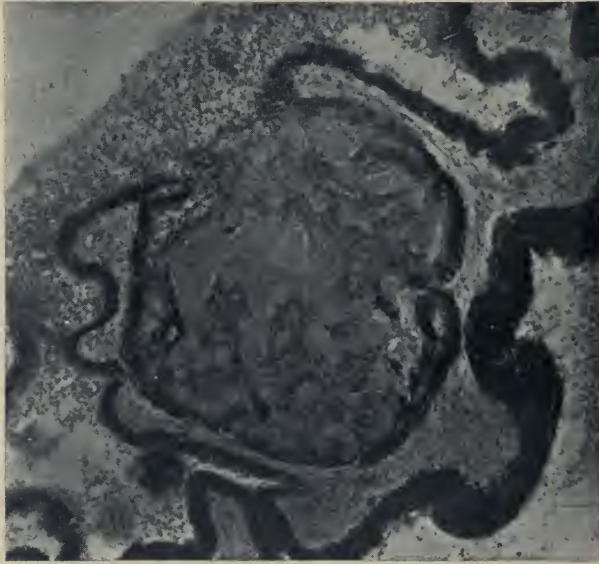


FIG. 6.

other tumors. In its composition and histological elements, it does not differ otherwise from the previous three tumors. Being situated in an eye suffering from purulent panophthalmitis, it shares to some extent, as might be expected, in this inflammatory process and numerous round cells are found in its peripheral parts, but this is not the zone of cell infiltration characteristic of malignancy.

I think from their structure, as here detailed, we must look upon these tumors as adenomata which take their origin from the layer of cells which is usually called the pars ciliaris

retinæ. That this layer, and with it the pigmented epithelium layer of the ciliary body, has a glandular function is now quite generally acknowledged. These two layers form the organ which secretes the aqueous humor.

The four tumors, here reported, show that the growth of the newformation takes place in two different ways. In three of them the tumor tissue simply pressed the neighboring pigmented epithelium layer in, together with the tissue of the ciliary process, thus forming a cup for itself, so to speak, the lining of which is the pigmented epithelium. In the remaining one the cells of the pars ciliaris retinæ have broken through the pigmented epithelium layer and expanded into the tumor in the tissue of the ciliary body and thus its outer surface is covered by the two layers as is the ciliary body in the norm, except at the small place where the perforation has taken place.

The amorphous coagulated substance which intervenes between the cells and is probably their secretion, is in the fourth tumor so plentiful and the cellular part in comparison so small, that if this process had gone on a little further, the tumor might have appeared like a large cyst. Cysts of the ciliary body have in a number of instances been described clinically. I know of no case in which a histological examination has been made. It is not impossible, that such a tumor, as here described, may, when seen throughout the pupil, look like a cyst and give rise to such a clinical diagnosis.

Other cyst-like changes are found in the ciliary body, especially at the root of the ciliary processes. To these I do not allude here.

A tumor-like newformation, consisting of innumerable unpigmented and pigmented epithelial cell tubules which had grown from the ciliary body into the interior of the eyeball within a cyclitic membrane, I had occasion to describe years ago. This was, as I thought and still think, simply an exaggerated form of tubular outgrowths from the ciliary body as is often met with in old cyclitic membranes. E. Treacher Collins simply called this newformation, described by me, an adenoma. In those days I thought that these cyclitic cell tubules originated in the pigmented epithelium layer and Collins says they are a pathological hypertrophy of what he described as "the glands of the ciliary body." As I have stated elsewhere (see

AMERICAN JOURNAL OF OPHTHALMOLOGY, Vol. XIII, p. 8). I am now of the opinion that these cyclitic tubular newformations originate in the cells of the pars ciliaris retinae and that the pigmented epithelium cells are but secondarily affected. The pigmented cell pegs which, especially in the pars non-plicata of the ciliary body, are seen to grow outwards from the pigmented epithelium layer into the tissue of the ciliary body (E. Treacher Collins' glands) have surely nothing directly to do with these cell tubules which grow inward into a cyclitic membrane, as I have time and again seen the two co-existing without any signs of proliferation or hypertrophy in the pigmented cell pegs.

As I have stated before, I can find in the literature no case reported of this form of glandular tumor which I have here described. To be sure Collins, in his book, entitled "Researches Into the Anatomy and Pathology of the Eye" (page 68), has a chapter on adenoma and carcinoma of the ciliary body. Yet, his cases and those he refers to, were not what we have here seen. Besides his own two cases, he adduces my case, above referred to, one of Michel and one of Badal and Lagrange.

The first case of Collins' was a melanotic tumor springing from the ciliary processes invading the muscle and the root of the iris which he found in the eye of a woman which had twenty-five years previously been injured and become blind. The eye had been enucleated on account of a painful inflammation. This tumor was originally described as a sarcoma, but in bleached sections it was found to consist of cells which, especially in the part most pigmented, were arranged in parallel columns. Collins calls it a primary melanotic glandular carcinoma of the ciliary body.

The second tumor which he examined was also found in the eye of a woman. Sight had within six months become gradually destroyed and the eye had become painful and inflamed. The tumor sprang from the ciliary body and was anteriorly deeply pigmented, while its posterior part was unpigmented. The cells composing its central portions were very degenerate, much swollen and their outlines ill-defined. In the less degenerate peripheral parts the cells were of epithelial character and "arranged in a way suggestive of a glandular structure."

These two cases are evidently very unlike the ones I have described.

Badal and Lagrange (*Archives d'Ophthalmologie*, 1892, p. 143) found in one eye two whitish nodules in the ciliary body which were composed of regular tubules of one layer of cylindrical epithelial cells with a central lumen, furthermore, solid cell cylinders and atypical collections of epithelial cells. They called this a case of primary carcinoma of the ciliary body.

Michel (*Graefe's Archiv*, Vol. XXIV, p. 140) detailed a case in which a tumor started from the ciliary processes and had grown inward and forward until it touched the posterior surface of the iris. On its posterior surface it was covered by the pars ciliaris retinæ. In its tissue he found "connective tissue with endothelial proliferation and cells with a gland-like proliferation arrangement." He terms this tumor a mixed endothelial and epithelial carcinoma, but sees its origin in the cells of the pars ciliaris retinæ.

The two cases, the one of Michel and the other of Badal and Lagrange, seem to approach the four cases reported by me more nearly in structure and general character than do those of Collins. Yet, in all of these cases the tumor was malignant, or so considered, and these eyes had been removed on account of blindness and painful inflammation induced apparently by the presence of these tumors.

The four tumors reported by me differ materially from all of these. They were certainly not of a malignant character. They had in no case, so far as I know, rendered the eye which harbored them blind. Not one of them had caused a painful inflammation. The only one that shows signs of inflammation was located in an eye which suffered from a traumatic acute panophthalmitis. Histologically, my tumors undoubtedly started all from the cells of the pars ciliaris retinæ, involved only one ciliary process and were, therefore, microscopical in size, and show no tendency to rapid expansion and destruction of the neighboring tissues and no peripheral zone of cell infiltration. They are absolutely unpigmented and their glandular structure is well marked.

It seems, therefore, that they are instances of a form of tumor of the ciliary body not heretofore described, and I consider them as benign adenomata springing from the pars ciliaris retinæ, with the possibility that further observations may prove

their congenital origin and possibly the pre-existence of a true glandular organ in the ciliary processes in the eyes of some lower animal or, perhaps, in the fœtal eye of man.

NOTE ON THE PIGMENTED GLOBULAR EXCRESCENCES OF THE IRIS OF THE HORSE.

BY ADOLF ALT, M.D., ST. LOUIS, MO.

[WITH MICRO-PHOTOGRAPHS]

AFTER the previous paper had already been handed to the printer I found I had in my possession the anterior part of a horse's eye. As good luck would have it, the iris had two pigmented globular attachments to it at the pupillar margin.

E. T. Collins ("Researches Into the Anatomy and Pathology of the Eye," page 55) gives the drawing of a section of such a benign tumor attached to the horse's iris, and states that "in unbleached sections little can be made out of the arrangement or shape of the cells of which it is composed. It is very cavernous, and blood vessels are seen coursing through it, continued on from those in the stroma of the iris. Bleached sections show the mass to be made up of flattened epithelial cells, which line and form columns between numerous, variously sized, circular spaces."

I do not know whether anybody else has ever studied this excrescence more intrinsically, which, by the way, is of frequent occurrence among the horses of this country. I have no doubt, that this has been done, yet, in conjunction with the previous paper my findings may be of some interest to the readers of this Journal.

I have a number of microscopic slides of older date of such excrescences in my collection. In these the excrescence appears almost perfectly round. The excrescences, here under consideration, however (see Fig. 1), show no smooth and rounded outline, but a very irregular periphery on account of numerous smaller excrescences which spring from the larger and older one.

The excrescence is very deeply pigmented and it seems,

as if the pigmented layers of the iris had grown around the pupillary edge, forward into the anterior chamber and taken on their peculiar shape. In the unbleached section numerous round and oval spaces are seen, which are free from pigment and appear as cavities. Furthermore, a number of blood vessels are found within the dark pigmented tissue.

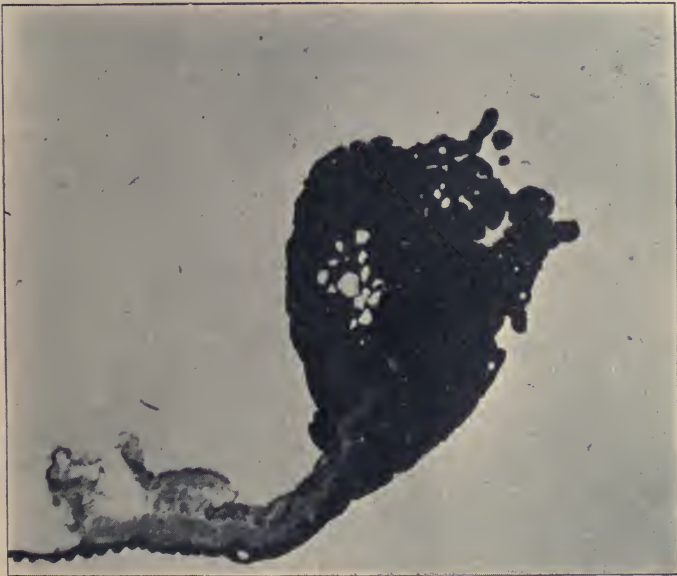


FIG. 1.

When the pigment is bleached out, the tumor is seen in reality to be an outgrowth of the retinal layers of the iris (see Fig. 2). The two layers grow evidently forward together to form the excrescence. Yet, in doing so, some of the iris tissue grows with them and forms a small quantity of connective tissue within the tumor in which the blood vessels are embedded. The tumor cells proper are evidently all epithelial and by far the largest part of the excrescence consists of them. Parallel rows of cells are frequently seen in the mass of cells, especially in the septa between the cyst-like cavities. In consequence, the excrescence has an undoubtedly glandular appearance and in so far and concerning its origin, it is similar to the benign glandular tumors in the ciliary body which I

have described in the previous paper. Even the cavities might be cited as analoga to the spaces filled with a coagulated substance as described in the adenomata of the ciliary body.

After all, however, it is very questionable whether in the iris excrescence of the horse we have to deal with a really glandular structure. The parallel rows of cells, I think, are

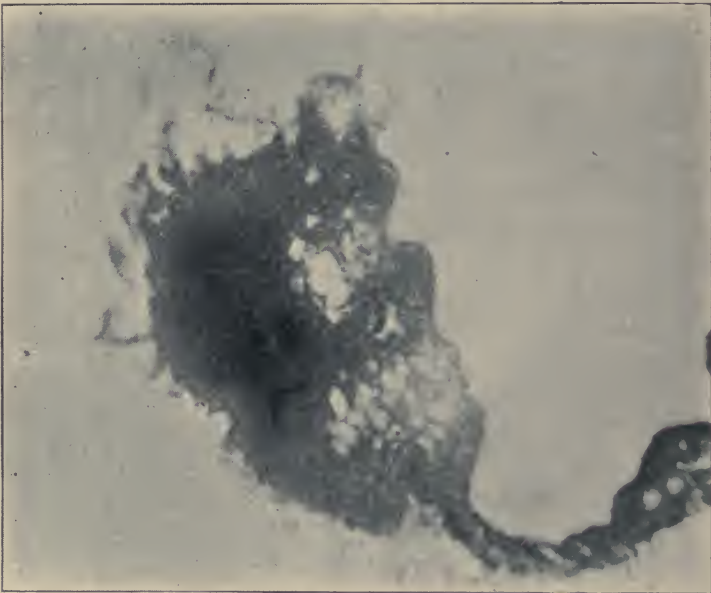


FIG. 2.

not an undoubted evidence of such a nature, as the two layers forming the pigment layer of the iris grow forward together and a parallelism of the cells must therefrom naturally follow.

Yet, this is, so far as I am aware, the only structure found in the eye of a lower animal, which in any way might be mentioned as something akin to the adenomata of the ciliary body, which I have found in the human eye.

THE REMOVAL OF CATARACT WITHOUT THE
AID OF THE KNIFE.

BY J. ELLIS JENNINGS, M.D., ST. LOUIS, MO.,

SURGEON TO THE EYE DEPARTMENT OF THE ST. LOUIS EYE, EAR, NOSE AND
THROAT HOSPITAL—OPHTHALMIC AND AURAL SURGEON TO THE
ST. LOUIS MULLANPHY HOSPITAL.

SEVERAL months ago I received a communication from the Walker Pharmacal Company, of St. Louis, with the above startling sentence printed in large letters on the envelope. The inclosed circular went on to state that "no little interest was excited several years ago by the publishing of the history of a case by Dr. R. Mercer, of Port-of-Spain, in which was narrated the cure of a cataract of which the Doctor personally suffered, by the instillation into the eye of the fresh juice of *Cineraria Maritima*, a plant indigenous to that country. The disease first manifested itself by producing a slight impairment of vision, and subsequently turned out to be of the kind known as 'soft lenticular.' It gradually grew worse in both eyes, until 1882, fourteen years after the first appearance of the affection, when the left organ, which was the better of the two, was operated upon, but without success. As time went on, the Doctor's sight became still worse, until in February of 1888, he was strongly urged to try the juice of *Cineraria Maritima* by friends who related cases in illustration of its virtues. Having nothing to lose, as he was totally blind, he made a trial of the remedy, instilling two drops of the juice into each eye three times a day. On the fourth day, a faint glimmer of light was perceived by the right eye, and at the date of writing, April 13, 1888, Dr. Mercer could discern figures and even faces under a good light, as well as the hands of a watch." * * *

"This narrative has every evidence of being given in perfect sincerity, and W. T. Thiselton Dyer, F.R.S., C.M.G., Director of the Royal Botanic Gardens, Kew, says, 'it seems to me to bear many intrinsic marks of accuracy.'"

"After the publication of this letter the drug was similarly employed by other medical men. One of these gave a patient a small quantity and was naturally very much surprised

when she asked him for a further supply, saying that since she had used the remedy her sight had gradually improved.

"Other instances of similar and even more astonishingly favorable results have been often reported since, and the reputation of the remedy seems to be spreading and asserting itself.

"Leading physicians and ophthalmologists are now using the preparation, imported for us, both in private and hospital practice, with generally good success."

After reading this circular, I gave the matter no further thought, until I received several letters of inquiry from subscribers of the Journal, as to the merits of the preparation. Thinking it might be of interest to our readers, I called at the office of the Walker Pharmacal Company, which, by the way, is located on the third floor of a building occupied by Luyties' Homœopathic Pharmacy, and introduced myself to the manager, who proved to be Mr. Luyties. On stating my business, he referred me to a young man, a graduate of a homœopathic medical college who, he said, had made a special study of the subject. I was shown numerous letters endorsing the drug, but none from any one of recognized standing. The following are samples of what the circular calls "*convincing evidence*":

"This makes the third bottle I have purchased for Mr. W. for cataract of right eye and it is doing wonders for him. He had lost the left eye, and the right eye was about gone also, but the remedy is restoring his sight."

"I am now using the third bottle and am fast gaining back my sight. The dark formation has burst, and I suppose in time will entirely disappear. Dr. P. also has examined my eye and says there is a decided change."

One lady, after using one drop in each eye night and morning, for a month, writes: "I can say now, with certainty, that my eyes are better. I took up our daily paper last night and without much effort could read it, and the type is not a clear black either. At one time I could not read it at all. Of course, I used my glasses."

"I received one (bottle) from you ten days ago, and the patient thinks it is helping him" Etc., etc.

I then stated that such reports, usually a mere statement of the patient, could not be relied upon and were of no value. As the circular states that "leading physicians and ophthal-

mologists were using the preparation, with generally good success," I asked to see a report from an ophthalmologist. They had none. I then asked if they would be willing to furnish me with a quantity of the drug so that I could test its value in a number of selected cases. After a consultation they refused to grant my request.

In conclusion, I would state, that so far as I could learn, there is no evidence to show that *Cineraria Maritima* is of any value as a curative agent in cataract, and from the action of the Walker Pharmacal Company, they evidently are not anxious to have the drug properly tested.

SIMULATION DE L'AMAUROSE AND DE L'AMBLYOPIE.

PAR S. BAUDRY,

Professeur à la Faculté de Médecine, Lille, France.

ABSTRACT BY LUCIEN HOWE, M.D., BUFFALO, N. Y.

IN European countries, where each able-bodied citizen must serve in the army, it is natural that various expedients should be resorted to by some to escape the loss of time and substance which such services require. For this purpose, one of the most common and successful methods is the simulation of imperfect vision in one eye or both. It is well known that certain pseudo-physicians gain their livelihood by giving systematic instructions to young men as to how to feign the imperfect sight which will enable them to escape military services. Recruits even go further, and occasionally mutilate the eye in order to escape duty, and the writer of this review has seen, within the last year, a Sicilian who allowed the lens of the right eye to be punctured with a needle, by one of these professional mutilators in order that the resulting imperfect vision might enable the man to escape the draft. While the simulation of imperfect vision is, therefore, of much greater importance in Europe than in this country, the subject is of interest to us, because of the simulators who wish to obtain damages from individuals or companies, or are in search of pensions, or belong

to that class of perverts, hysterical or otherwise, who find a certain satisfaction in disease and the sympathy which it excites. It is especially from the medico-legal standpoint that monographs on the simulation of blindness are interesting, and why this one by Professor Baudry warrants special attention.

Although written originally to form a part of the "System of Diseases of the Eye," edited by Norris and Oliver, it has been published separately and seems worthy thus of particular mention.

Of course, unilateral amaurosis is the form usually feigned, and the writer devotes considerable space to the different methods for its detection, dwelling upon the objective signs—namely, the condition of the pupil and the direction of the visual axes. In considering the latter, interesting observations are made concerning the ability which certain persons have to produce a strabismus at will, but, as the writer very well observes, if the examination be prolonged, the patient is seldom able to maintain sufficiently this unnatural position of the visual axes.

Passing next to the subjective methods for detecting this form of the fraud, the writer takes up in order the procedure of Javal-Cuignet with its different modifications, the various contrivances which produce false images by means of mirrors, the tests made with glasses, spherical, cylindrical and prismatic, the various modifications of the stereoscope arranged to entrap the patient, and finally the tests with colored letters or other characters.

These are all inconclusive enough when an intelligent subject, well trained to deceive, insists that one eye is absolutely blind (amaurotic), but when he admits that there is still some vision remaining, the difficulties of detection are intensified to a considerable degree.

An excellent résumé is given of the various abnormal conditions in the refracting media which are occasionally overlooked, or which are difficult of detection even after attention has been called to them. But with proper attention to this, practically the same rules hold for detecting amblyopia as for an amaurosis.

An interesting condition, and one also difficult to detect, is an hysterical amaurosis or amblyopia following traumatism. The general practitioner has to deal often enough with cases

of so-called "railway shock" or other trouble in which, there being some real lesion, more or less marked, the resulting damage is greatly exaggerated by the hysterical condition of the patient.

Nearly every ophthalmologist must have seen these cases, where the imperfect vision is out of all proportion to the injury sustained. In their detection, as Baudry mentions, a single examination is seldom sufficient, but if enough time be allowed it is usually possible to trap the unwary patient by some of the well-known tests which show on what slight basis the claims really rest.

Finally, the detection of blindness feigned in both eyes is comparatively easy, and there are few persons sufficiently adroit to avoid their own condemnation, if sufficient time is allowed for suitable observation.

In general, this little pamphlet presents an excellent résumé of our knowledge of this subject, which is too often passed with but slight mention in our text-books, or even in larger treatises on the eye.

ADDITIONAL PAMPHLETS RECEIVED.

"Adeno-Carcinoma of the Nose," by M. Thorner, M.D.

"Eighth Annual Report of the New Orleans Eye, Ear, Nose and Throat Hospital."

"A Clinical Report on the Use of Argonin in Gonorrhœal Ophthalmia," by E. C. Ellett, M.D.

"The Advantage of Physical Education as a Prevention of Disease," by Ch. Dennison, M.D.

"The Determining Cause of the Site of Ulcers on the Nasal Septum," by E. C. Ellett, M.D.

"The Cure of Certain Chronic Diseases by Modern Methods," by W. D. Gentry, M.D.

"The Rational Care of the Eyes of the Newly-Born at and Immediately After Birth," by R. Sattler, M.D.

"Homonymous Torsion; A Position of the Retinal Meridians Hitherto Unrecognized," by E. P. Brewer, M.D.

"Surgery of the Pneumatic Sinuses of the Skull in Relation to Ophthalmic and Aural Surgery," by R. Sattler, M.D.

TRANSLATION.

CONCERNING THE OPEN-WOUND TREATMENT IN EYE OPERATIONS.

BY PROF. DR. HJORT, CHRISTIANIA.

[*Hirschbèrg's Centralblatt*, October, 1898.]

TRANSLATED BY ADOLF ALT, M.D., ST. LOUIS.

IN consequence of the communications of Dr. Praun and Professor Czermak, I am again obliged to say a few words concerning the open-wound treatment in eye operations.

My standpoint in this question is, that the "physiological toilette of an eye" is the main factor in an aseptic healing after eye operations, and I am gratified that a continually increasing number of operators seems to share in this operation. The recognition of the importance of the tear fluid and of the movements of the lids which, as experiments and clinical experiences have taught us, are necessary to keep the eye always clean, must of necessity lead us to remove everything which might hinder these efforts of nature and to consider every occluding bandage as dangerous and unnecessary. Knowing this, we have made quite a step forward.

There remains the "hollow bandage" which forms no obstacle to the physiological toilette of the eye whether air is admitted through it or not. Of late, the number of experimentors with it seems to be on the increase, but more especially with the wire gauze, since for theoretical reasons they do not accept my views gained by practical experience. I think, that in this they are wrong. While these operators are especially afraid of mechanical insults (from the hand) and therefore adopt mechanical means of protection, I regard these latter as obnoxious, especially when they exclude air and light, because moist heat acts unfavorably and because the admission of quiet, moderated light does not only not hurt eyes after cataract ex-

traction, but may even act beneficially. In support of this opinion I shall later on give a striking example. Furthermore, by preventing photophobia, the light shortens the period of after-treatment. I may add that I am afraid of any mechanical apparatus so close to the eye and the possibility of its slipping. We have often seen how the best applied binocular bandage would slip during the night and thus attract the hand to the head. I am satisfied that the wire gauze would disturb my sleep, even with healthy eyes. Such an appliance is in general the more out of place, the more complicated it is. The simplest one is usually the best, in all surgery.

Since my last publication on this subject I have met with nothing which could shake my trust in the open-wound treatment. Yet, twice it occurred that the eye operated was mechanically insulted.

The first case was that of a woman, aged 79 years. She was operated on without iridectomy February 14, 1898. For eight days everything went well. The pupil was round and central. Then the patient was out of bed and received a visit from her daughter who wanted to examine her vision, and did this so awkwardly that a corner of her shawl hit the operated eye, forcing the patient to withdraw her head, exclaiming, "Oh, that hurt!" There was a prolapse of the iris in the evening which was clipped at once and followed by the reposition of the iris edges. A chronic state of irritation resulted which but after a long time disappeared gradually.

This accident can not be mentioned against the open-wound treatment, because even had the eye been bandaged, the bandage would have been removed on the ninth day, and it is altogether impossible to protect patients against such accidents.

The other case was that of a laborer, aged 74 years, with a swollen cataract of the right eye. There was stilloidum but no blennorrhœa of the sac; the lower lid was without tone, the punctum was everted and the mucous membrane somewhat irritated. When 20 years old, he had a binocular eye affection accompanied by redness, pain and loss of vision (iritis?). A bacteriological examination of the conjunctival sac (agar) was made February 28. After thirty-six hours, numerous colonies had appeared 2 to 4 mm. in size, round and glistening, which consisted of diplococci with a tendency to

chain formation and which were stained by Gram. Besides, there were a number of punctiform colonies, looking like dew-drops, and consisting of thick bacilli, some of which were thicker at the ends. On account of the swelling of the lens and the narrow pupil, the cataract was extracted with iridectomy March 2, 1898. When the iris was excised, its uveal layer remained glued to the lens-capsule and was partially removed with the nucleus. Operation in other respects correct. In the night of March 4, the patient had severe pains in the eye and temple which were alleviated when he opened the eye in the morning and a stream of hot tears rolled down his cheek. On March 5, we noticed: Continued copious discharge of mucus, conjunctiva reddened; cornea not quite clear, a gray substance in the pupil; atropine does not act; vision reduced. In the evening there was chemosis, the lids slightly swollen and a gray exudation along the incision which, however, had disappeared next morning. Patient had pain during the night and related later on, that he had dreamed, a fly was sitting on his forehead. In trying to chase it, his hand touched his face and a pain in the eye woke him up. The wound was not found ruptured and the eye was red as before, the cornea diffusely steamy, the central part of the iris swollen, light perception only. A localized suppuration developed in the anterior part of the vitreous body, as was found upon enucleation of the eye, March 16.

This case is so extensively reported that it can be interpreted by all.

As is seen, an infectious inflammation developed, on the second day already, with pain in the night which in turn led to the movement of the hand toward the eye during the night following the third day. An occluding bandage would hardly have been borne, a moist antiseptic bandage could hardly have obviated the movement of the hand, on the other hand a wire-gauze or fenestrated plate might have done so. I do, however, not believe that the touch of the hand influenced the previous infectious inflammation in any manner.

This, among 118 extractions, is the only case in which I consider it doubtless that an infection through the incision took place. It was a complicated case in which the iris was easily irritated and according to my usual principles, this eye should not have been operated on at all, because

the drainage of the tears was bad, the mucous membrane unclean, and the fellow eye could read. I repent having given way to his wish to have it operated on.

I want to emphasize at least that not the open-wound treatment, but the inflammation was the cause of the external insult.

I want to add a few cases of open-wound treatment.

I. J., a woman, aged 67 years, was operated on without iridectomy on February 14, 1898. Immediately after the lens was delivered, a large quantity of vitreous body prolapsed, the wound gaped and soon a stream of bright red blood ran down the cheek. The patient (which I had not known beforehand) was a hæmophile and some years previously had come near dying from the extraction of a tooth. There was also arteriosclerosis. In the following days blood oozed from the wound which contained a plug of bloody vitreous body, but stopped finally on the application of ized compresses. The patient suffered much from lancinating pains in the eye, which remained red. The corneal flap, bent forward, remained dim, yet no inflammation took place; all this time the lids did not swell. The eye was lost, of course, yet the patient had suffered so much through the pains due to the intra-ocular hæmorrhage, that I could not induce myself to propose immediate enucleation, which, too, would probably have been refused. Only three weeks later, when the conditions had again been for some days supportable and the eyeball moved freely, while the corneal flap was still turned over and the wound gaping and when the patient was convinced that the operation did not have the desired result, he consented to the enucleation. This was made March 7 in narcosis. During this operation the slight pressure of the speculum caused a stream of bright red blood to flow. The after-hæmorrhage was so copious, that the orbit had to be tamponed and a compressive bandage had to be applied for three days; after that everything went well. When the eyeball, hardened in formol, was opened the retina was found totally detached, the globe in the anterior part collapsed, otherwise of normal shape and size, since a firm blood clot surrounded the detached retina and another one lay between choroid and sclerotic. Not a trace of suppuration, no necrosis of the corneal flap.

As an indication for a monocus (binocus is never ap-

plied) I regard a superficial, fresh, painful loss of corneal substance, if the conjunctiva is moderately clean. I, therefore, apply this form of bandage to ambulant patients.

Another illustration of open-wound treatment is the following case. The patient, last operated upon, a laborer, aged 65 years, was very hard of hearing, which is always a disagreeable complication, because it is difficult to guide the patient during the operation. Simple extraction June 3. Operation typical in all its parts. During the night the patient had pain in the back so that he had to be turned to the side and two days later the heat of the bed became so unbearable to him that he had to stay out of it for two or three hours in the fore- and afternoon. June 6, the eye was free from irritation, dry mucus on the skin of the lower lid; cornea and iris absolutely normal. On the day after the operation the pupil was slightly drawn towards the wound, pear-shaped; yesterday more central, slightly oval; to-day perfectly round, central, very mobile. No instillation; the upper lid was not touched. This spontaneous and complete return of the pupil to the norm was astonishing and is undoubtedly explained by the miotic influence of the sun. Since there was no photophobia and the room faced south, the sun entered freely. Four days after the operation the nurse placed him into a heavy reclining chair with the back to the window. Left alone, the patient turned the chair in order to see the people passing by. No irritation occurred, the pupil remained in place and fourteen days after the operation the patient was discharged.

It seems to me that among others these examples speak plainly in favor of the open-wound treatment. With this method it is all-important, according to my opinion, to see that the conjunctiva is clean, the tear drainage effective, and that before extractions all the lashes are removed by epilation.

SOCIETY PROCEEDINGS.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

H. R. SWANZY, F.R.C.S.I., President, in the Chair.

THURSDAY, OCTOBER 20, 1898.

Glioma of the Optic Nerve.—This paper was read by MESSRS. J. F. BULLAR and DEVEREAUX MARSHALL. The case upon which it was based was that of a woman, aged 37 years, who noticed nothing wrong until 1889, when the left eye became more prominent than natural. It continued to become more and more pushed forwards until 1895, when Mr. Bullar operated, and removed the tumor with the eyeball attached. Immediately behind the globe the optic nerve was of normal size for a distance of 15 mm. It there formed a pear-shaped swelling 50 mm. long and 20 mm wide. A cyst-like cavity was found inside this, which contained straw-colored fluid. On opening the interior was found to be rough and vascular, and had a fatty appearance. The tumor was encapsulated. The optic nerve was completely lost as soon as it entered the tumor, and it was not again seen at the posterior part, as the growth extended at least as far as the optic foramen, and was cut across behind. The patient did quite well, and had since got married, and was in good health. The tumor was proved by microscopic examination to have originated in the neuroglia, the authors have therefore termed it a glioma of the nerve. The eye was normal. In the literature on the subject 130 cases of growths of the optic nerve were recorded, and the results of these showed that the tumors were of slow growth, but should be classed as malignant, as they were liable to extend into the brain, although metastases had not been found in any case. The question of growths of all sorts found in the optic nerve was discussed, and although the different terms applied to them were legion, yet the authors were strongly of opinion

that the majority of them would fall into three groups: (1) Those originating in the neuroglia, which should be termed "gliomata"; (2) those originating in the dural sheath, "sarcomata"; and (3) those originating in the pial sheath, "endotheliomata." Mr. Bullar added that there had been no difficulty in removing the tumor. As soon as the conjunctival sac was opened the finger passed easily into the orbit, and the tumor was easily defined; it was not necessary to clean out the orbit. The posterior section of the growth was made as close to the apex of the orbit as possible, but the tumor was cut through, so that some portion of it must have been left behind. It would have been quite easy to remove the whole of it, leaving the eye behind; but in the stretched condition of all the parts he had not thought this advisable.

THE PRESIDENT remarked on the rarity of tumors of the optic nerve. He only remembered seeing one case.

MR. TREACHER COLLINS commented on the great variety of names which had been given to this form of tumor. He thought the best classification was the anatomical one—those originating in the sheaths of the nerve and those starting in the nerve itself. The optic nerve was a band of prolongation of the brain substance, and gliomata of the optic nerve resembled those of the brain in structure rather than those of the retina.

The Tension of the Eye in Irido-Cyclitis.—This communication, which was presented by CAPTAIN H. HERBERT, I.M.S., was based on observations of 144 eyes affected with irido-cyclitis. In the majority of attacks, more especially in the milder attacks, the tension was, as in simple hyperæmia of the iris and ciliary body, reduced; the reduction lasting, as far as the evidence went, at least as long as any ciliary injection remained. In other cases a period of high tension of very variable duration came on. The high tension appeared to be due to blockage of the normal outlets from the anterior chamber, and the eyes chiefly affected were (1) those very severely attacked, with copious exudation, and (2) eyes perhaps lightly attacked but predisposed to glaucoma, as shown by shallow anterior chamber in the sound fellow eye and by more or less advanced age of the patient. In these high tension cases the anterior chamber was deepened and the pupil slightly dilated. In the

most intense inflammations the plus tension rapidly gave way to a softening, which might be permanent and which indicated atrophy of the ciliary body. The mild attacks, which were little removed from primary subacute glaucoma, were of interest because of difficulties in diagnosis and in treatment. There were no grounds for attributing high tension to cyclitis as distinguished from iritis.

MR. PRIESTLEY SMITH said that the principles enunciated by Captain Herbert were now generally accepted. There were two processes, mutually antagonistic, concerned in the regulation of tension in irido-cyclitis; one was the suppression of secretion, reducing the tension, the other was the formation of an albuminous exudation hindering filtration and raising the tension. He had been glad to hear in this paper of the value of the tonometer he had introduced; after longer experience he thought it very valuable if its limitations were recognized. He had made some experiments on tension some years ago, in which a perfectly limpid albuminous fluid obtained from a serous cavity had been injected into one eye of a cadaver and normal saline solution into the other. In the former the tension was raised, in the latter it was not raised, showing that albuminous fluids will not filter through animal membranes.

Card Specimens.—The following were the card specimens:
MR. R. M. GUNN—Case of Retinal Disease. MR. R. D. BATTEN—Superficial Central Choroiditis.

OPHTHALMIC DIGEST.

By J. ELLIS JENNINGS, M.D.,

ST. LOUIS, MO.

METASTATIC CARCINOMA OF THE EYEBALL.

In an interesting article on this subject published in "The Royal London Ophthalmic Hospital Reports," 1897, C. Deveaux Marshall records two cases and gives an abstract of twenty-two others already published. Of the twenty-four,

eighteen were females and five were males, while in one case the clinical history was entirely lost. Most of these cases occurred in middle-aged persons, the youngest 28, and the two oldest 57 years of age. The tension of these eyes forms an interesting feature. It was normal in eleven cases, plus in seven cases, minus in four cases, and not recorded in eight cases. Total, thirty eyes for twenty-four persons. Here we see that the usual condition is to have normal tension and the least common minus tension. These cases differ in this respect from the ordinary sarcomata which affect the choroid. The difference, however, is not surprising when one considers the anatomical peculiarities of these tumors. These growths are nearly always flat and thin, and consequently they are less likely to lead to the pushing forwards of the lens and iris, and to the blocking of the angle of the anterior chamber, as is so notably the case in eyes containing choroidal growths far back. With regard to the position of the primary growth, it is at once apparent that a large proportion of the patients suffered from carcinoma of the breast; of the twenty-four cases, seventeen suffered from this disease, one being a male, the rest females. One male and one female suffered from primary cancer of the lung and pleura. The three who had cancer of the stomach were all males. The usual span of life in these cases is from one month to two years.

One of the most marked features concerning the dissemination of carcinomata is the readiness with which the lymphatic system becomes involved. The lymphatic glands in the neighborhood of the primary growth are practically always the first to become affected, and it is frequently only at a late stage that there is positive evidence of the vascular system having become the means of carrying the tumor cells to distant parts of the body. As the eye can only become involved through the vascular system, one would consequently expect that this organ would but rarely become affected, and that only in the later stage of the disease. This is exactly what we find in the majority of cases.

If, therefore, there is reason to suspect the presence of a tumor in the eye of a patient suffering from carcinoma elsewhere, it should at least put us on the lookout for confirmatory evidence of metastasis in other parts of the body.

As far as treatment is concerned, it can obviously be only

palliative, as it is hopeless to imagine that internal organs are unaffected if the eye is already involved. On the other hand, there is absolutely no reason why such eyes should not be removed; they are liable to attacks of acute glaucoma, and may, if they ulcerate, become extremely painful, whereas, excision at an early stage removes at least one source of discomfort, while the patient loses but a useless organ.

A NOTE ON A METHOD OF OPERATING FOR ECTROPION OF THE LOWER EYELID.

The following operative procedures for the cure of ectropion of the lower lid are recommended by Dr. Argyll Robertson (*British Medical Journal*, June 11, 1898). An incision is made through the skin of the outer third of the lower lid, parallel to and about 2 mm. distant from its margin. When the incision has been carried as far as the outer canthus the knife is directed a little more upward, and the incision continued for about half an inch. It is then carried horizontally outward for about 6 mm., and lastly, downward and inward, nearly parallel to the upward incision, but diverging a little from it below, for the distance of about an inch and a quarter. The flap of skin thus outlined is then dissected from subjacent parts and reflected back. Next a suitable V-shaped portion of the whole substance of the lower lid is removed at a little distance (say 3 mm.) from the outer canthus. The "strap" of the skin which has been reflected is now drawn upward and outward till the edge of the lid is brought up to its natural position, and the skin which it overlaps is then outlined by bringing the knife along the edge of the strap, and the portion thus outlined dissected off. Lastly, the strap is then replaced and fixed in position by several sutures. It is advisable not to remove a large V-shaped portion of the lid at first, as a little more can easily be snipped away if on drawing the lid into position by means of the strap, a puckering of the edge of the lid indicates that too little has been removed.

This operation is particularly useful in senile ectropion or eversion of the lid from long-continued palpebral conjunctivitis, but it may be advantageously employed in other forms of ectropion also. The chief advantages found in this method of operating are: (1) That the exact amount of lid tissue that

should be removed is easily ascertained; (2) that by means of the strap of skin very efficient and permanent traction on the lower lid is obtained, thus bringing it and fixing it in proper position. Instead of removing the skin that lies under the strap, where it is drawn up so as to bring the lid into position, a small portion of the extremity of the strap might be cut off and the effect would be similar. But the author prefers the method described, giving, as it does, a larger surface on which to fix the strap. The author has only had the opportunity of performing this operation on three cases, but in all (and one was a very severe and complicated traumatic case), the result was excellent.

PAMPHLETS RECEIVED.

"Strabismus," by F. B. Tiffany, M.D.

"A Case of Tenonitis," by E. C. Ellett, M.D.

"Acute Inflammation of the Middle Ear," by E. C. Ellett, M.D.

"Simulation of Amaurosis and Amblyopia," by S. Baudry, M.D.

"Manifestations of Syphilis in the Mouth," by L. D. Bulkley, M.D.

"The Dangers of Specialism in Medicine," by L. D. Bulkley, M.D.

"Report of the Nederlandsch Gasthuis voor Ooglijders," June 4, 1898.

"Dynamics of the Extrinsic Ocular Muscles," by F. B. Tiffany, M.D.

"Three Cases of Intracranial Abscess, etc.," by J. F. McKernon, M.D.

"Orthoform and Extract of Suprarenal Glands," by W. Cheatham, M.D.

"Glaucoma With Detachment of the Retina," by W. Cheatham, M.D.

"Surgery in Obstinate Neuralgia of the Mastoid Region," by R. Sattler, M.D.

BOOKS AND PAMPHLETS.

AUGENÄRZTLICHE UNTERICHTSTAFELN FUER DEN AKADEMISCHEN UND SELBSTUNTERICHT (OPHTHALMIC TABLES FOR TEACHERS, ETC.). Edited by DR. H. MAGNUS, Breslau. J. U. Kern's Verlag (Max Mueller).

We are in receipt of the following numbers of this collection, to which we have drawn our readers' attention at a former occasion:

No. II. *The Development of Senile Cataract.* By DR. H. MAGNUS.

The text, in which the clinical aspect and the pathology of the development of senile cataract is shortly detailed, is illustrated by eleven tables showing the different phases.

No. III. *The Movements of the Eyes in Their Normal and Pathologic Conditions.* By DR. E. LANDOLT, Paris.

This is a reproduction of the old and well known chart by Landolt made more useful by some additions in illustrations and text.

No. VII. *The Most Important Tumors of the Eye.* By DR. A. VOSSIUS, Giessen.

A short description of the more well-known and frequent tumors of the eye, this number also includes tubercle of the choroid. It is accompanied by fourteen tables, not all of which, however, are up to the general excellence of the illustrations in these series.

No. IX. *The Topographic Relations of the Orbit to the Neighboring Cavities of the Skull.* By DR. H. CZERMACK, Prag.

Fourteen very instructive tables drawn from frozen specimens illustrate the text of this number.

No. XII. *The Structure and Ophthalmoscopic Appearance of the Chorioidea.* By DR. R. GREEF, Berlin.

In this number the descriptive text is accompanied by a large and two small tables explaining the histology of the choroid in eyes with different amounts of pigment.

We can only reiterate our wish, formerly expressed, that this collection of instructive plates may at some day appear in the English language.

DIE MIKROSKOPISCHEN UNTERSUCHUNGSMETHODEN DES AUGES (THE METHODS OF EXAMINING THE EYE MICROSCOPICALLY). By DR. S. SELIGMANN in Hamburg. Berlin, 1898. S. Karger, Karlstrasse 15. Price, 6 mark.

It is undoubted that this volume will be hailed with great pleasure by all whose work lies in this direction and by the student who wants to take up such work. It contains almost all that a man can know, at this date, about how to examine an eye and its different structures microscopically. If we have any criticism to offer, it is that it contains really too much and may, in consequence, prove bewildering to the beginner. On the other hand, the bacteriological methods are almost totally disregarded. This is decidedly to be regretted, as it would render the otherwise excellent book still more useful.

CLEFT PALATE; TREATMENT OF SIMPLE FRACTURES BY OPERATION; DISEASES OF JOINTS; ANTRECTOMY; HERNIA, ETC. By W. ARBUTHNOT LANE, M. S. London, The Medical Publishing Company. Price, 5 shillings.

This little series of clinical lectures, very nicely and plentifully illustrated, is full of evidences of a wide range of experience and replete with interesting suggestions. We recommend it to our surgical confrères.

AIX-LA-CHAPELLE (AACHEN) AS A HEALTH RESORT. Translated by J. DOULLAN, M.B., M.Ch., B.A.O. London, J. and A. Churchill.

A very extensive description of this well known health resort. We are especially interested in the part written by the late Dr. L. Alexander on the affections of the eyes whose large experience in the treatment of eye diseases, due to syphilis, is known to all our readers.

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THE AMERICAN JOURNAL OF
OPHTHALMOLOGY.

VOL. XV.

DECEMBER, 1898.

NO. 12.

ORIGINAL ARTICLES.

A CASE OF AVULSIO BULBI.

BY CARL BARCK, M.D., ST. LOUIS, MO.

INJURIES of this kind are rare enough, and the English literature especially is so meagre on the subject, as to warrant the publication of a new instance.

A. M., farmer, aged 19 years, of House Springs, Mo., was driving home on May 28, 1897. The horses became frightened in consequence of the opening of an umbrella, and ran away. The wagon collided with a cedar-tree on the side of a rocky road, and was overturned. The patient was thrown out, and fell upon his face, striking on one of the stones. A forced attempt to regain his feet in order to avoid being crushed by the falling wagon, was successful. He felt a sharp pain, and, "putting his hand up, found his left eye hanging down on his cheek." His sensorium had not suffered from the fall, and he was able to reach his destination.

He was seen and attended soon afterwards by Dr. F. E. Guibor, of House Springs, assisted by Dr. Denny, of Burnesville. They found the eyeball lying on the cheek in front of the closed lids. The optic nerve and all the extrinsic muscles had been severed except the superior rectus, which held the eye as its only attachment. All they had to do was to cut the insertion of this muscle, and take the eyeball from off the cheek. Additional injuries were: fracture of the lower end of

the right nasal bone, with complete severance of the ala nasi, of which the mesial attachment alone remained. The right upper lip was cut through for about half an inch, between its inner and middle thirds. Furthermore, there was a fracture of the right clavícula. Under antiseptic dressings uninterrupted healing took place.

Dr. G. brought the patient to me in May, 1897, in order to inquire about an apparent paralysis of the upper lid, and the possibility of fitting an artificial eye. The patient presented a peculiar phenomenon. Seemingly there was a complete ptosis. My first supposition was that the insertion of the levator palpebræ superioris had also been ruptured by the injury, and that it would be necessary to search for and reunite it. But as soon as an artificial shell had been introduced, the faculty of opening the lids was re-established. On examining more closely I found, that when the orbit was empty, the upper edge of the tarsus was sunken down and backward, so as to change the direction of the muscle traction. According to the latest more minute anatomical researches (Wolff, *Berliner Klinische Wochenschrift*, 1896, No. 24), the tendon of the levator is not attached along the upper edge of the tarsus, but on its anterior surface. The line of insertion runs about in the middle of this, parallel to the free border of the lid, and not more than 5 m.m. distant. If now the posterior half of the lid sinks down to a lower level than the anterior, it is easily understood that the direction of the traction is reversed, and not able to widen the palpebral fissure. The drooping into the abnormal position was in all probability due to a laceration of the tarso-orbital fascia. When elevated by the insertion of the artificial shell, the normal action of the muscle was regained.

The conjunctiva lining the contents of the orbit presented the usual appearance; a slight contraction was noticeable. The patient could tolerate only a small artificial eye, the movements of which were fairly good, and he was ordered to return in a few months to get a larger one.

The specimen, which was kindly presented to me by Dr. Guibor, had been placed in alcohol, and was consequently somewhat shrunken. The accompanying drawing gives the actual size at the time. The optic nerve is surrounded by the intact dura mater sheath. It measures 23 m.m. The sheath has been torn off in an oblique direction, and overlaps the

nerve at the lower and temporal region 1 m.m., and at the upper and nasal about 2 m.m. Surrounding the nervus opticus there are about half a dozen ciliary nerves remaining, ranging from 10 to 15 m.m. in length. The stumps of the muscles adherent to the bulbus are quite large. They measure: external and internal rectus about 7, inferior rectus 8 m.m.; inferior oblique also about 8 m.m. Of the superior rectus a small mainly tendinous stump is left, and hardly any trace of the superior oblique, which must have been severed quite close to the sclera. Whether this was done by the physician, or at the time of the injury, can not be determined.



Mackenzie⁴ was the first one who used the term "luxatio bulbi," and defined it as an exophthalmos of such a degree that the eyeball has left the orbit entirely, and lies in front of the septum orbitale. He uses the word "*luxé*" (luxated) synonymously with "*chassé hors de l'orbite*" (driven out of the orbit). He presupposed the necessary ætiologic factor of a trauma as self-understood. Later a distinction was made between "luxatio" and "avulsio." In the former the eye lies in front of the lids, which close spasmodically behind it, the nerve and muscles being stretched; but the connection between the bulbus and the contents of the orbit is still maintained. In the latter this is wanting in consequence of the rupture of the optic nerve and the majority or all of the extrinsic muscles. Unhappily this important and practical distinction is not made in most of the current text-books, and there is lack of unanimity in the nomenclature. Stellwag, Zehender, Berry, Juler, Swanzy

and Nettleship do not mention either of these injuries. Soelberg-Wells, Fuchs, Schmidt-Rimpler (Roosa), and Fick treat only of luxation. So does Noyes, who uses instead the term "extrusion," and de Schweinitz, who calls it "dislocation of the eyeball." Norris-Oliver distinguish between "dislocations" and "tearing out of the eyeball." Bull, in Norris-Oliver's "System," deals summarily with the subject, without separation. Only Berlin, in Graefe-Saemisch, Michel, and Panas, make a sharp distinction between avulsio and luxatio.

The mechanical forces which produce the two conditions differ also to a certain degree. As a matter, of course, there must be a *vis a tergo* in order to press the bulbus out of its socket. The mildest degree of such force is familiar to every operator—namely, the protrusion of the eye after the insertion of the speculum when the patient presses much, coughs, or cries. Here the venous stasis produced by such acts increases the volume of the contents of the orbit and makes the eye protrude. That this movement might reach the degree of actual luxation under favorable circumstances is proven by the unique case of Dépoutol,¹³ where, in a young man with an opisthognathous face, violent blowing of the nose had this effect.

But the usual cause of luxation is a trauma by a voluminous blunt foreign body, which is forcibly pressed in between the wall of the orbit and the eye. This produces a similar but sudden and considerable increase of the tension of the orbital tissues. As the osseous walls can not yield, the pressure is propagated in a forward direction and forces the eyeball out between the lids. We consequently find luxation after injuries of a most varied character, and it is conceivable that in one instance the stream from a fire-engine as reported by Reyssié,⁶ and in two others a thrown ball, Covillard, quoted by Mackenzie⁴ and Jobert,³ were the ætiological factors.

The same mechanism obtains in intentional luxation, which is sometimes produced by the insane with their fingers, and furthermore, in the act of gouging as practiced in Virginia and the mountainous region of Bavaria during fighting. In Uganda, Central Africa, masters make their slaves one-eyed in this way, the one-eyed appearance serving as a livery.

Whilst in luxation, besides the increased tension of the orbital contents, a direct mechanical action of the entered body from behind may take place, this is the main factor in

producing avulsion. The foreign body acts here as a lever, the firm orbit walls serving as the fulcrum. It exerts consequently an enormous force, which is necessary for the division of the optic nerve and the muscles.

The accidents which lead to avulsion are mainly heavy falls on blunt projecting bodies, as in the case of Ross⁵. Relatively frequent it is the ring of a key in the key-hole upon which the patient falls. Verhaege² relates, "that a drunken fisherman, who lost his balance in undressing, fell against his bed-room door, so that a key, standing in the lock, divided the upper lid by a vertical wound. The key, acting as a curette (?), tore the eyeball so completely from its attachments, that the-organ rolled on the floor." Similar cases are reported by Herrgott⁸ and Arcoleo⁹. In another, Stuart's, quoted by Cooper,⁵ the result was more satisfactory; the bulbus had only been luxated, and was replaced, with recovery of sight.

A study of these cases leads to the conclusion that such a fall will merely produce a luxation, if the patient's natural recoil is directly backward. But more frequently the withdrawal of the head is an upward one, forming an angle with the first direction, thus enabling the foreign body to act as a lever. Such an occurrence might be supposed in our case, through the forcible attempt to rise, in order to avoid being caught by the falling wagon.

Flarer¹ reports a case in which a wild boar attacked a young man with his tusks and caused an avulsion of one eye. This was found lying on the os zygomaticum, the rectus internus and superior and the obliquus superior were ruptured. Flarer tried reposition and union by sutures, but sloughing of the eyeball was unavoidable.

For comparison I might shortly refer to the cases of luxation and avulsion in the new-born after difficult parturition and the use of the forceps and cephalotribe. Coccius¹⁰ reports a case of luxation of one eye due to a fracture and downward dislocation of the superior orbital wall. The child died soon afterwards. Steinheim¹² replaced a similarly luxated eye; the child recovered, but the eye was lost by suppuration. Guéniot¹¹ relates two cases of avulsion, one seen by himself, and another by Danyau, both ending fatally. In his case the child had been delivered under great difficulties, there was a wound through the right upper lid, and the right orbit was found

empty. The eye was afterwards discovered in the bed-clothing. The optic nerve attached to it was 12 m.m. long. The recti were torn close to the sclera, the obliqui somewhat farther off. Post-mortem showed extensive fracture of the upper and outer orbital walls. The author's view is, that not the action of the forceps, but the resistance of the promontory of the rachitic pelvis, caused the avulsion of the eye.

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⁶ Reyssié—Gazette des Hosp., - - -	1859.
⁷ Geissler—Die Verletzungen des Auges, - - -	1864.
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¹¹ Guéuiot—Recueil d'Ophth., - - -	1875.
¹² Steinheim—Centralbl. f. Prack. Aug., - - -	1879.
¹³ Dépoutol—Journal de Med. et Chir., - - -	1885.
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PSEUDO-EXTERNAL STRABISMUS.

BY HOWARD F. HANSELL, M.D., PHILADELPHIA, PA.

THE above title was suggested through a recent experience with a case of pronounced external strabismus, which, without treatment of any kind directed to the lateral muscles, became transformed into one of parallelism of the visual axes with a tendency inward (esophoria) of two degrees. The case teaches in unmistakable terms the value and necessity of deliberate diagnosis and brings out in a striking manner the superiority of the cobalt glass test in determining false tendencies and turnings of the ocular muscles. I have, in several short clinical papers, called attention to this test, but its adoption has not become general. Its advantages over all other tests are that it deforms the test-object (light) and changes its color to such a degree that the force of fusion, unless normally or almost normally strong, is dissolved, without refraction or change in direction of the rays of light passing

through it; hence, comparison is made of the impressions made on the foveal region of each eye, and not, as in some other tests, on the fovea of one and the extra-foveal region of the other eye. Its single disadvantage, in heterophoria, is its failure to make manifest defects of very low degree. In manifest deviations the perimeter, recommended by many clinicians, is far less trustworthy.

The determination of the degree and the kind of squint should be made, in all cases in which the patients have sufficient age and intelligence, by the forced recognition of diplopia. As is well known, diplopia is not a symptom of functional squint. On the contrary, its absence is a diagnostic point in differentiating from paralysis. Not infrequently interviews are fruitlessly spent in endeavoring to bring the brain to a consciousness of binocular vision, while occasionally it will be developed during the first few minutes. The mental perception of the false and true light comes gradually. The false light will disappear almost as soon as seen, to reappear, and finally, to remain after repeated trials or to be called up at will. Its perception and later its localization can be materially hastened by a dimming of the brightness and change in the color of the true light. This can be accomplished only by such an agent as a cobalt glass which will not refract the light from its projected position. Having now manifested the true and the false light a study of their relative positions will give positive information of both the kind and degree of the deviation. It is my belief that only exceptionally should an operation for the cure of squint be undertaken until the diagnosis can be firmly established by this, which might be designated as the "natural diplopia" test. From neglect of it fruitless operations will be made and muscles be cut that should not be interfered with.

The following case, briefly recounted, illustrates two facts—namely, the value of correct diagnosis and the dependence of lateral upon vertical deviations. But few cases of marked lateral squint are free from the complication of abnormal vertical tensions, or to state the proposition more positively, many cases of esotropia and exotropia depend upon hypertropia and are cured by restoration of vertical balance.

J. M., aged 21 years, was operated on five years ago by division of the external rectus of the left eye for the cure of a wide divergence of that eye. Some improvement, satisfactory

to the easily pleased surgeon and patient, resulted, but it is hardly possible that binocular fixation was secured. In September, 1898, the patient desired to have the tenotomy repeated. Examination by the diplopia test showed divergence of fifteen degrees and associated with it left hypertropia of from four to eight degrees. The patient was surprised that I declined to sever the externus. He claimed that the fault was one of divergence and resided only in the left eye. After several examinations I found that with correction by prism of the vertical deviation bringing the false and true light on one horizontal plane the images became either homonymous or fused. The superior rectus of the left was rather freely divided, over-correcting the hypertropia as shown by the change in elevation of the false light. A conjunctival suture was inserted and drawn sufficiently tight to bring the false into the plane of the true light. There remained esophoria of two degrees due to the mistaken operation of five years ago. At present the patient has binocular single vision for all distances and is able to pursue his studies in a law school with entire comfort. Thus, his external strabismus was not a true indication of the tension of the lateral muscles but was secondary to the vertical squint. Upon the restoration of vertical balance the pseudo-external strabismus was entirely and permanently dissipated.

It is probable that instances of false projection and of double foveæ described by Thomas and others might be explained by the want of harmony between the apparent squint and the relative positions of the false and true images.

A CASE OF SARCOMA OF ORBIT.

BY GEO. H. GOODE, M.D., CINCINNATI, OHIO,

PROFESSOR OF OPHTHALMOLOGY IN CINCINNATI COLLEGE OF MEDICINE AND SURGERY,—OPHTHALMOLOGIST TO CINCINNATI CHRISTS AND PRESBYTERIAN HOSPITALS.

MICROSCOPICAL EXAMINATION BY ADOLF ALT, M.D., ST. LOUIS.

PATIENT, Nellie B., aged 11 years. A growth was first noticed by the parents in March of the present year, developing at the lower and outer portion of the left orbit.

When seen by me in May, following, there was some exophthalmos; the eyeball was not limited in its excursions; there was no diplopia; no pain; V.=1. Ophthalmoscopic examination reveals normal condition of the disc. The growth, which was rather firm, was distinctly outlined by palpation.

An operation was performed removing all of the growth, without sacrificing the eyeball. The incision was made through the lower lid, the line corresponding with rim of the orbit. The immediate result was all that could be desired, the wound healing well and the patient being able to return home in about two weeks.

June 15. Patient returns. She states the growth reappeared about a week after she was at home.

Stat. præ. Eyeball more prominent than at first and somewhat limited in excursion downward and outward. Palpation reveals a rather firm mass on the floor of the orbit and projecting somewhat beyond the margin of the orbit. Exophthalmos is now so great that the eyelids do not close during sleep. Ophthalmoscopic examination reveals marked swelling of the disc. V.=0.4.

An operation was again performed, which consisted in the removal of the eyeball and the rest of the contents of the orbit. The cavity was packed with iodoform gauze. The subsequent course of the case up to June 30 was without any incident of importance.

A portion of the growth removed at the first operation was submitted to Dr. Heidingsfeld for examination, and he reported that it was a small round-cell sarcoma. The microscopic appearance of the tumor and the clinical history of the case were suggestive of a growth of this kind.

July 15. The original site of the growth is perfectly healthy in appearance, but a nodule about the size of a hazelnut has developed anteriorly at the inner and lower portion of the orbit; the integument of the eyelid is discolored considerably. The rest of the orbit having such a healthy appearance, it was decided to make another operation, removing the growth together with the suspicious portion of the lower eyelid. The gap in the lid was repaired by sliding flaps. The repair was very good, and there being no return of the growth at the end of a month's time, the patient was sent home.

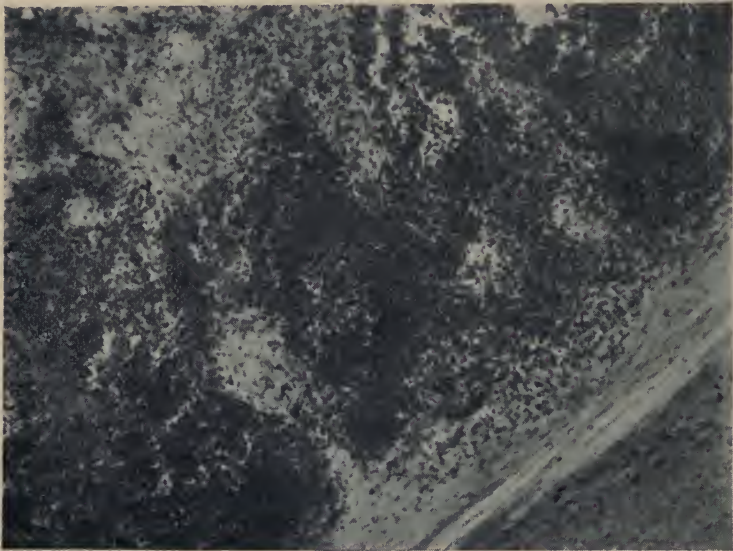
September 10. The mother writes that the growth has

again returned and states that the girl's condition is not as good as it was when she came home. "She becomes tired easily and is compelled to rest in bed much of the time."

Feeling that further operative interference would be useless and possibly dangerous on account of her failing condition, I refused to do anything.

MICROSCOPICAL EXAMINATION.

The tumor reached me in a badly preserved condition, so that it could no longer be well hardened. This interfered, of course, materially with the making and staining of the microscopical sections.



The tumor had the size of about a small wall-nut. On the cut surface it showed a loose structure and quite a large amount of the tissue fell out during the cutting into sections. It is surrounded by a dense capsule but attached firmly to a quantity of loose orbital tissue removed with it. There is a small superficial erosion on the cornea of the accompanying eyeball and a well-marked optic neuritis and choroiditis.

The tumor elements are mostly large round cells intermixed with smaller ones. (See illustration). Here and there

are remnants of hæmorrhages and hæmorrhagic pigmentation. The tumor cells are divided into larger and smaller parts by thick septa of connective tissue which usually show one or several vascular lumina and appear to be blood vessels with enormously thick walls from perivasculitis. The tumor has, in consequence, an alveolar appearance. Whether it had this character primarily, I do not know. This secondary tumor is an alveolar large round cell sarcoma.

ANOTHER CASE OF ADENOMA OF A CILIARY
PROCESS.

BY ADOLF ALT, M.D., ST. LOUIS, MO.

[WITH MICRO-PHOTOGRAPHS]

HARDLY had the article describing four cases of adenoma of the ciliary body starting from the pars ciliaris retinæ been printed (see AMERICAN JOURNAL OF OPHTHALMOL-

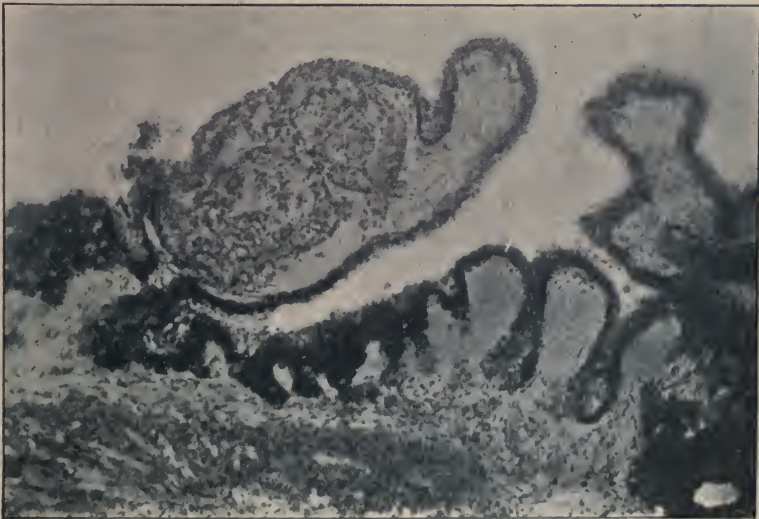


FIG. I.

ogy, November number, 1898), when it was my good fortune

to meet again with the same kind of tumor in an eye which had by a colleague been removed on account of an injury. (See Fig. 1).

It so happened that when making meridional sections of the anterior half of this eye, I came across this little tumor of which I have only five slides, denoting its thickness in an æquatorial direction. The sections are slightly slanting.

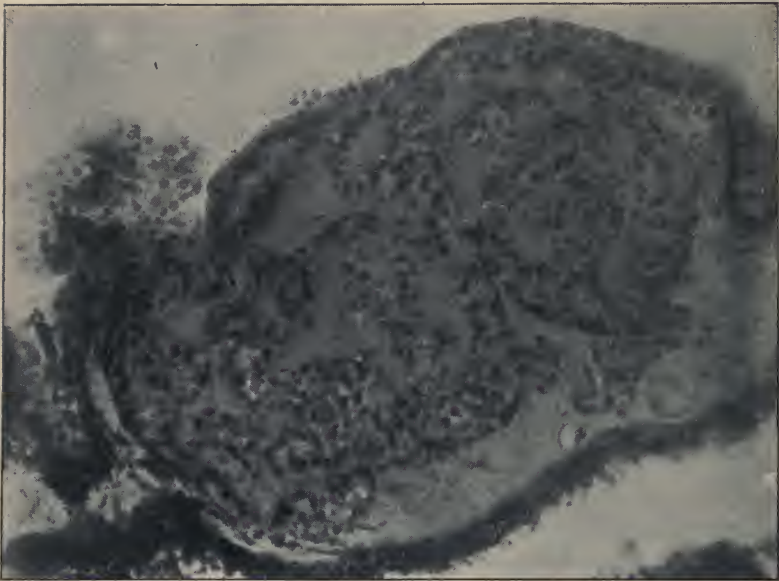


FIG. 2.

The elements (see Fig. 2) of which the tumor consists are, like in the previous ones, the cells of the pars ciliaris retinae, forming glandular tubules between which lies an amorphous substance.

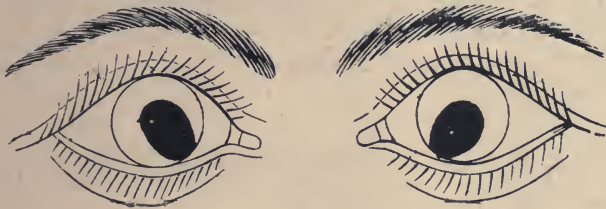
Otherwise this tumor in its growth corresponds with the second one, in that it has grown inward through an opening of the pigmented epithelium layer and is, except at this opening, covered by this and the retinal layer.

REPORT OF A CASE OF BINOCULAR COLOBOMA
OF IRIS, CILIARY BODY AND CHOROID.

BY L. R. CULBERTSON, M.D., ZANESVILLE, OHIO,

OCULIST TO U. S. PENSION BUREAU; C. & M. V.; B. Z. & C. RYS.; CITY HOSPITAL, ETC.

MISS B. C., aged 15 years, brunette, physically and mentally well developed. The patient has in both eyes corectopia (wrong position of pupil) and dyscoria (wrong shape of pupil) due to coloboma. Her pupils are pear-shaped, their apices pointing down- and inward. On the instillation of atropia they dilate almost completely but retain their pyriform shape. The accompanying illustration approximately repre-

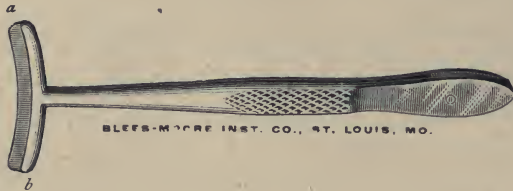


sents their shape when under the influence of atropia. The ophthalmoscope at the apices of pupils shows a small portion of ciliary body wanting. There is also a coloboma of both choroids and retinae in the inner lower quadrants. The colobomata of the retinae extend farther back than choroidal colobomata. In the left eye there is atrophy of retina at the posterior pole. She requires — 1.5 cylinder ax. 15° for right eye, and does not improve vision which equals $\frac{5}{12}$ Rem. and J. VI prox; Left eye requires — 1.5 cyl. ax. 120° , and does not improve vision which equals light only. Both discs are quite pale but not cupped, and the vessels are absent in the colobomata, otherwise they are of good size in the healthy portions of the retina of the right eye; very fine in left eye. There is neither nystagmus nor strabismus, no notching of teeth, nor other evidences of inherited syphilis. Tn. both. The pupils react normally both concensually and direct to light reflex. There is some pigment on the anterior capsule of right eye at apex of pupil. She has had this deformity since birth. She has neither hare-lip nor any other congenital deformity. The parents were not related, nor were there any congenital deformities in the ancestors.

A NEW ENTROPIUM FORCEPS.

BY CARL BARCK, M.D., ST. LOUIS, MO.

IN entropium operations I have always experienced a difficulty in making the inner incision through the tarsus easily and uniformly parallel with the margin of the lid, with any of the clamps or horn plates in use. To facilitate this incision I had this instrument constructed. One branch of the forceps has a wide blade, *a*, with three little holes, the other a narrow one, *b*, with three teeth. After inversion the lid is held between the two, the large one serving as a support (like Jaeger's horn plate), the other as a ruler along which the section is made. This can be accomplished with one continuous stroke and makes the incision parallel to the edge of the lid.



The illustrations show the instrument for the lower lid, reduced one-third. The one for the upper has larger and more curved blades. Dimensions for the upper are: length of blades 30 m.m., width $5\frac{1}{2}$ and 3 m.m.; for the lower: length 25 m.m., width 5 and $2\frac{1}{2}$ m.m. The instrument can be made with or without a catch. Having used it with satisfaction for about four years, I can recommend it to the profession.

SOCIETY PROCEEDINGS.

REPORT OF THE MEETING OF THE HEIDELBERG OPHTHALMOLOGICAL SOCIETY.

AUGUST, 1898.

FIRST SESSION.

President: LANDOLT (Paris).

NORMANN-HANSEN (Copenhagen).—“On the Methodical Use of Conjunctival Sutures as the Typical Treatment of Severe Injuries to the Eyeball.”

Based on a large experience the author recommends the suture of the conjunctiva without buried sutures of the sclerotic in all cases of perforating injury, conjunctival covering of corneal wounds, and when at the same time the lens is injured an iridectomy followed by conjunctival suture. With this method he claims to prevent, with equal certainty, infection, ectasy of the scar, secondary glaucoma, and later detachment of the retina.

SIEGRIST (Basel).—“On the Dangers to the Human Organ of Vision From Ligating the Common or Internal Carotid”

Having reviewed the literature, which is mainly surgical, on this subject, the author related the follows cases:

1. Ligation of the common and internal carotid on account of after-hæmorrhage following an operation for carcinoma of the tongue. Acute blindness on the side of the ligation with the picture of embolism of the central retinal artery. Post-mortem examination six days later: Ascending thrombus beginning at the side of the ligation which reaches into the ophthalmic artery for 6 m.ms. Otherwise this blood vessel is free, but an obliterating embolus lies in the arteria centralis retinae at its origin and is covered with thrombotic substances. This is the first case in which an eye with a recent embolism has been anatomically examined. The changes induced by it in the retina refer to the inner layers. The cornea showed an infiltration which from the periphery spread to the center, a small central ulcer and peculiar changes in the epithelial layers.

2. Traumatic pulsating exophthalmus. Ligation, blind-

ness on the same side with the picture of embolism. Five months later atrophy of the optic papilla; the choroidal blood vessels are now all visible, partly normal, partly sclerosed, fine pigment deposits in the retina. After one and one-half years the region of the macula lutea shows no sclerosed choroidal vessels, but still some fine pigment spots, the remainder of the choroideal vessels is totally sclerosed, large masses of pigment in the retina.

AXENFELD (Rostock) — "Concerning the Histology and Physiology of the Lachrymal Gland."

But once, by Kirchstein, an attempt has been made to explain anatomically the fact that children in the first weeks of life can not weep. He thought that the lachrymal gland, being still in an embryonic state, was unable to secrete. Axenfeld thinks this explanation wrong. The appearance of the cells of the gland only proves that it *does* not secrete, but not that it *can* not do so. Axenfeld found the adenoid tissue wanting in the newly born, but this can no more explain the fact, since in old age the gland atrophies although the adenoid tissue increases. He seeks the cause in an insufficient innervation, more particularly in an insufficient development of the central parts since the lachrymal nerve has well-developed narrow sheaths. The fact that man only can weep has always been a stumbling block for the Darwinian theory, and the fact that the newly-born can not weep does not do away with this obstacle.

HFINE (Marburg) — "Changes in the Shape and Index of Refraction of the Human Crystalline Lens After Section of the Zonule, With Remarks on the Index of Refraction of Lenses Removed From Myopic Eyes."

Since Tscherning and his pupils still maintain that the changes in the shape of the lens during accommodation, as described more fully by them, are due solely to the pulling of the zonule, Heine made some experiments on the eyes of corpses in order to study the influence of relaxation of the zonule. In these eyes the lens had not the accomodating shape. After the removal of cornea and iris the radius is found to measure 23 to 14 m.m., after the zonule has been cut, it is 8 to 10 m.m

A softer albuminoid substance is found at the anterior pole which, when the zonule is relaxed, has a lower index

(1.380) than when the zonule is taut (1.390); thus the total refractive index is in the latter case 1.330, in the former 1.440. This current of a softer albuminoid substance to the anterior pole and the increased convexity due to it may thus be experimentally produced by relaxing the zonule.

The direct measurement of the refractive index of lenses removed by operation from highly myopic eyes does not show it to be larger.

In diabetes with high-grade sclerosis of the nucleus without non-translucent dim portions this index was found considerably higher. The myopia found by skiascopy is explained solely by this high index, the axis was not elongated.

UHTHOFF (Breslau)—“Visual Hallucinations Caused by Diseases of the Visual Organ.”

The author reported a number of rare observations, in which the visual hallucinations were directly due to the eye disease.

1. Central choroiditis with positive scotomata. Visual hallucinations as leaves, shrubs, lion's head, etc., the size of which increases with the distance and which must move with the eye, etc. In spite of these characteristics they must be looked upon as of central origin but enhanced by the peripheral changes.

2. Visual hallucinations with sympathetic ophthalmia.

3. One-sided hallucinations with monocular central chorioretinitis. However, in one-sided hallucinations the eye of the same side is not always the diseased one.

4. Hallucinations which are not projected into the preserved parts of the visual field in cases of binocular neuritic atrophy of the optic nerve. The hallucinations of completely blind individuals are of purely central origin.

The author spoke especially of the hallucinations in hemianopia and related two cases; they are usually located in the defective, rarely in the well half (Henschen). They occur occasionally without hemianopia. Finally, the author ventilated the question of elementary visual perceptions with cortical visual troubles (light and color perceptions).

E. VON HIPPEL (Heidelberg)—“On the Clinical Diagnosis of Alterations in the Endothelial Layer of the Cornea and Their Value in Differentiating Certain Corneal Affections.”

When a drop of fluorescein solution is brought into the conjunctival sac, places in which the endothelium is wanting or diseased are visibly stained green. This staining in the depth results since the fluorescein penetrates through the normal anterior parts and is retained in larger quantities where the endothelium is lacking. This is proven by experiments.

Von Hippel has made twenty-five positive observations in man. The central parenchymatous infiltration (Saemisch) originates at the posterior surface of the cornea. The typical parenchymatous keratitis which invades the cornea from the periphery does not begin with an alteration of the endothelium. He found endothelial changes in congenital buphthalmus. Keratoconus originates most probably in the posterior surface. Internal ulcers of the cornea are found in the newly-born and may clinically be diagnosed by means of fluorescein. Certain other parenchymatous corneal opacities in the newly-born are due to a permeability of the endothelium; intra-ocular hæmorrhages may bring this about; yet they are not accompanied by any intra-ocular inflammation.

The corneal opacity of acute glaucoma and in some cases of iritis, as proven by the staining with fluorescein, is due to the penetration of aqueous humor.

AFTERNOON SESSION.

UNVEILING OF THE BUST OF OTTO BECKER.

BERNHEIMER (Vienna) delivers the oration on behalf of the committee and hands the bust over for safe-keeping to Leber.

LEBER (Heidelberg) thanks the committee and especially Bernheimer for his efforts in getting up this monument and equally the artist who sculptured it. He further delivered a warm and honoring oration on Becker.

HANS BECKER (Frankfort) thanks in the name of the family.

DEMONSTRATIONS.

President: AXENFELD (Rostock).

SIEGRIST (Basel) specimens illustrating his paper.

DOE (Lyons) an operating table with a very practical head rest.

GROENOUW (Breslau) specimens of nodular opacities of the cornea.

VON HIPPEL (Heidelberg) green stain of the center of the cornea of a rabbit after injuring the corresponding endothelium.

BACH (Wuerzburg) specimens and pictures of axial cataract, lentiglobus posterior, persistent foetal connective tissue in the vitreous body with anomalies in the papilla and the site of the entrance of the retinal vessels in a case of anencephalus.

TRAUN (Darmstadt) two cases of acromegaly with hemianopsia.

HESS (Marburg) the pathological anatomy of congenital total cataract. The nucleus shows the typical conditions of zonular cataract, the cortex is a grumous substance. This shows a near connection between congenital zonular and total cataract.

PFLUEGER (Bern) Hegg's color-perimeter.

LEBER (Heidelberg)—1. Congenital intra-ocular inflammation in a goat due to bacilli (examined with Dr. Addaris). 2. Several cases of melanoma and melanotic tumors of the conjunctiva and orbit. 4. Glioma of the Pars ciliaris retinae. 5. A patient with hyperostosis of the orbit after insufficient exenteration for melanotic tumor.

SCHNAUDIGEL (Heidelberg) a rare ophthalmoscopic picture.

GRUNERT (Tuebingen) dilator pupillae in man and some animals.

LANGE (Braunschweig) a real dakryops. Actinomyces of the lachrymal canaliculus.

DOR (Lyons) peculiar ophthalmoscopic picture.

HEINE (Marburg) specimens of highly myopic eyes, staphyloma posticum, and changes in the fovea centralis.

SCHANZ (Dresden) shows on samples that yellow ointment must not only be kept from the light, but also not be prepared with fats which become rancid, as they will cause a combination of the fatty acids with the mercury. Water does not affect it.

KIRIBACKI (Japan) the elastic tissue in the eye shown with Weigert's new method.

REIMER (Zuerich) endarteriitis and endophlebitis prolifera of the retinal vessels.

WEISS (Maunheim) recommends spectacles made of celluloid for protection (in one piece for both eyes) for the examination for double images and in place of wire shields.

SCHANZ (Dresden) a new Zeiss corneal microscope.

GRUNERT (Tuebingen) a patient.

DIMMER (Innsbruck) specimens concerning the course of the optic nerve fibers.

SECOND SESSION.

President: MAIER (Karlsruhe).

SILEX (Berlin)—“On the Central Innervation of the Ocular Muscles.”

Silex studied this experimentally. We know three points in the cortex from which we may produce movements of the eyes by electric irritation:

1. In the region of the visual sphere in the occipital lobe.
2. Anteriorly in the frontal lobe in the sphere of the neck.
3. In a portion of the facialis center (Hitzig's center).

The first two are associated centers, the one of Hitzig seems to represent the center of voluntary eye movements; whether it governs all the muscles, is still questionable. His experiments show it to govern the abducens and superior oblique muscles. Silex thinks that a case of traumatic leftsided nystagmus horizontalis should be referred to a lesion of this center, because irritation with weak currents only produces movements of the opposite eyeball.

 BERNHEIMER (Vienna)—“On the Reflex Course of Pupillary Reaction.”

In order to find the site and arrangement of the reflex fibers for pupillary reaction anatomical researches were made of human embryonic brains, experimental ones on apes (method of degeneration of Marchi) and physiological ones on living apes (section of chiasm and tractus). Results:

1. The optic nerve fibers are partially crossed in the chiasm.
2. The pupillary fibers also are undoubtedly crossed in the chiasm.
3. Each eye is connected with the sphincter nucleus of the same and of the opposite side by pupillary fibers.
4. The partially crossed pupillary fibers pass with the partially crossed optic nerve fibers backwards to the region of the corpora geniculata, where they turn off toward the median line to reach the sphincter nuclei which are situated in the anterior portions of the anterior corpora quadrigemina below the aquæductus.

5. Aside from this connection of each eye with both sphincter nuclei by means of the partially crossed fibers, there

is also a connection of both eyes with these nuclei by means of a central communication between the two nuclei.

6. It is very probable that this connection of the two sphincter nuclei is made by the processes of the ganglionic cells of both.

BACH (Wuerzburg)—“Experimental Researches Concerning the Course and Origin of the Pupillary Fibers and the Reflex Center of the Pupil.”

After exenteration of the orbits of cats and rabbits, the brains were examined after Marchi's and Weigert's methods. Bach succeeded in finding connections between the tractus opticus and the superficial layers of the anterior corpora quadrigemina and to prove in rabbits changes in the opposite tractus pedunc. transvers. However, he could not find a direct communication of the so-called pupillary fibers of the tractus with the nuclei of the eye muscles. After section of the opticus no alteration was observed in the amakrine cells of the retina. Decapitation experiments proved the reflex center of the pupil in the cervical medulla right below the medulla oblongata in apes, cats and albinotic rabbits. From this he constructed a new scheme of the pupillary innervation and on it demonstrated the probable site of the lesion in different pupillary anomalies.

HERTEL (Jena)—“Results of Section of the Optic Nerve in Young Animals.”

Cutting one optic nerve, the blood vessels being left intact, in three weeks' old rabbits produced the following results: Six months later total atrophy of the nerve fiber layer, twelve months later the ganglionic cells have disappeared; the supporting fibers are slightly hyperplastic; the granular layers are almost normal, slight alterations in the rods and cones. The growth of the eyeball is retarded, probably due to the lack of function.

SCHMIDT-RIMPLER (Goettingen)—“Ulcus Rodens.”

The author states that Mooren's precise description is not adhered to satisfactorily in most text-books, so that *ulcus rodens* was even confounded with *ulcus serpens*. Clinical cases are related, as also one anatomical examination of a case which had progressed very far.

At the progressing edge the epithelium was raised to a large extent, at the opposite edge, where cicatrization had

taken place, there was a thick nodule of several epithelial layers, beneath it many blood vessels. In the periphery, too, a very vascular newformed connective tissue was found under the hypertrophic epithelium. Beneath this the cornea was nearly intact in one-half or one-fourth of its normal thickness. The pupil was occluded

The separate attacks in which this ulcer progresses may be explained by assuming that bacteria are collected under the undermined epithelium, the toxins of which, when sufficiently formed, induce a progress of the ulcer. Anæsthesia of the cornea is usually lacking nor does the affection resemble a keratitis neuroparalytica, which speaks against the assumption of a paralysis as its cause. Specific microbes causing it, could not be found, only staphylococci grew in the cultures.

RAEHLMANN (Dorpat)—“On Marginoplastic by Transplantation of the Mucous Membrane of the Lip for the Cure of Trichiasis From Trachoma.”

The author recommends the transplantation of labial mucous membrane after removal of the ciliary part of the lid as a typical measure. The results are good and lasting. The labial mucous membrane heals on in two clinically and anatomically different ways. Specimens show the condition five weeks after operation. In the one group clinically no sharp limit of the flaps can be recognized, the transplanted tissue has lost its anatomical character, in the other the shrunken flap shows a distinct outline and it has preserved its anatomical character completely, showing a true transplantation.

HESS (Marburg)—“Experimental Researches Concerning the Intra-Ocular Pressure During Accommodation and the Extent of Accommodation in Different Mammals,” made together with Dr. Heine.

Experiments with local irritation as well as of the ciliary ganglion in dogs, cats, rabbits and a young wolf showed uniformly that these animals have but a very rudimentary accommodation (1.5 to 2.5 D.). Since this fact robs all previous experiments concerning the influence of accommodation on the intra-ocular pressure almost totally of their value, the question had to be restudied in animals with a large extent of accommodation like apes and pigeons (10 to 12 D.). Measurements

with Hoeltzke's double manometer uniformly showed that even the largest contractions of the ciliary muscle with corresponding increase in refraction do not in the least influence the intra-ocular pressure. In man, too, maximal contraction of the ciliary muscle does in no way alter the visible retinal blood vessels or the color of the fundus. Morat's and Doyon's statement, that the sympathetic is antagonistic to the oculomotor and governs the focussing for instance, could not be verified.

THIRD SESSION.

President: DIMMER (Innsbruck).

A. VON HIPPELL (Halle)—“On Congenital Total Color-Blindness.”

The author reports a new case which he has especially examined in view of the hypothesis of Ladd Franklin, A. Koenig and von Kries, according to which this affection is due to the absence of the cones.

Patient, a student aged 21 years, amblyopia from infancy (vision equals $\frac{1}{x}$); can do fine work with proper light, bright light blinds him. When not fixing his gaze, there is a slight divergent strabismus and a peculiar form of nystagmus. During fixation these disappear. His differentiating faculty is at least equal to that of normal eyes. The spectrum, which is shortened at the red end, normal at the violet end, he sees as a colorless band; its lightest point lies at 510μ . The white values are for him the same almost as in the norm. His blind spot is of the same size and locality as in normal eyes. There is no central scotoma corresponding to the fovea, on the contrary in his eyes, too, a central region could be found which, as in the norm, showed when adapted for dark a smaller susceptibility to weak light stimuli than the neighboring retina. He could not see his macula entopically, yet the influence of the absorption due to it could be experimentally demonstrated. Simultaneous and successive contrasts acted as in normal eyes, as also the after-images of a moving light point. The faculty of differentiating of space in the eccentric parts of the retina was normal. The patient had distinct vision in but a small part of the field, hence his inability to read fluently. Increasing the illumination to the intensity of diffuse daylight renders him unable to read even large print. These facts do not support the theory of color-blindness, above referred to.

UHTHOFF (Breslau) — "Contribution to the Knowledge of Total Color-Blindness."

A young man, aged 16 years, always amblyopic and color-blind; no heredity. As. hyp. 2 D., ophthalmoscopically normal. $V. = \frac{1}{VI}$, glasses do not improve. The eccentric visual acuity examined in the horizontal meridian is the same to about 7° from the point of fixation, inward and outward, and then decreases continually, just as in the norm, toward the periphery. No central scotoma. Regarding the dependence of central visual acuity on the intensity of illumination, his eye showed nothing abnormal with an intensity of from 0 to $\frac{1}{80}$ meter-candle. From here the normal visual acuity increases rapidly, while that of the color-blind eye increased but slowly and reached its maximum at an illumination with 12 meter-candles and then fell slowly. Patient sees better with smoked glasses. He complains of being blinded by bright daylight.

He recognizes no colors. In a table (after Hippel) the different colors and beneath them the group seen by the patient are represented. The brightest part lies in green. When the colors were photographed the lightest part corresponded to blue. When the illumination is reduced so far that normal eyes can no longer recognize colors, the conditions are very much the same in the color-blind eye as in the norm. The light-sense of the color-blind eye is not abnormal, neither in the peripheral nor in the central parts of the retina.

PFLUEGER (Bern) — "Results of the Examination of a Totally Color-Blind Patient."

A young girl, aged 14 years, very intelligent, has two color-blind sisters. All of them have a reduced visual acuity, photophobia, and nystagmus during fixation. Parents blood-relations. The central light sense is at least as good as in the norm, the peripheral one surpasses the central. The spectrum is shortened at the red end, normal at the violet end. The lightest part lies near this end. Of the equivalent invariable colors of Hegg which in the norm appear equally light to the periphery, the color-blind calls green the lightest, yellow, and especially red, the darkest. Centrally blue and green appear equally light. When comparing Hering's pigments with black and white with reduced illumination and adaptation for dark, a color-seeing and a patient with defective color-perception gave

the same answers as did the color blind. There is no distinct central scotoma. The retina of the color-blind during adaptation for dark and weak illumination acts the same as a normal one. The physiological equality of the fovea shows an equal anatomical structure. The peripheral visual acuity decreases more and more toward the periphery which does not speak for the assumed constant visual acuity of the rods. The visual acuity of the color-blind rises at first with decreasing illumination, then falls, yet not as regularly as in a normal eye. Successive contrasts produce normal results.

SATTLER (Leipzig)—“A Simplified Method of the Operative Treatment of Myopia and Its Results.”

Agreeing with Hess and from an extended experience of his own, the author recommends in myopia the primary extraction of the clear lens without iridectomy. Incision with hollow lance, capsulotomy with a special sharp hook, repeated spooning with a Daviel's spoon. Extraordinary shortening of the healing and the absence of disagreeable irritating conditions and increase of intra-ocular tension, are the factors rendering this method superior to discission.

LAQUEUR (Strassburg)—“A Case of Binocular Homonymous Hemianopsia With Preservation of a Minimal Central Field; Post-Mortem Examination.”

The case clinically was perfectly typical and showed the characteristic defects. Post-mortem: several foci of softening were found in both occipital lobes, on one side in the cuneus, on the other side in the cuneus, the lingual and fusiform lobe. Laqueur thinks that the optical cortical center is larger than has been thought.

SCHOEN (Leipzig)—“The Pathological Anatomy of Glaucoma Prolapticum.”

Having expounded his well-known opinions of the anatomy of the normal ora serrata, the author reports that he has recently found in glaucomatous eyes the so-called cavities of Blessig and the retinal spurs of an extraordinary size.

DIMMER (Innsbruck)—“The Course of the Optic Fibers.”

An otherwise normal eye was enucleated on account of an epibulbar tumor. The patient died six weeks later. Optic nerves, chiasma and cerebral trunk were examined in frontal serial sections after Marchi's method. A partial decussation

in the chiasm is distinctly seen. The crossed and uncrossed fibers do not lie completely separated. In the lateral parts of the chiasm there are, however, only uncrossed fibers. In the tract the uncrossed bundle lies ventrally at the free margin, in other portions both kinds of fibers are mixed.

The degenerated fibers go to the corpus geniculatum externum, the crossed ones mainly into the ventral white substance, the uncrossed ones into the central parts. The lateral portion is free from degeneration. A small degree of degeneration is found in the anterior branch of the anterior corpus quadrigeminum, and just barely visible in the superficial white substance of this body. Very little degeneration in the pulvina close to the corpus quadrigeminum, corpus geniculatum internum, posterior corpora quadrigemina and corpus Luys were normal. The orbital end of the optic nerve, stained after the Weigert-Pal method, still shows normal nerve fibers. Thus after six weeks not all the fibers are degenerated; probably those severed from their ganglionic cells degenerate first. Those still normal are probably the centrifugal and pupillary fibers. The central end station of the optic fibers is the external corpus geniculatum.

VON MICHEL (Wuerzburg)—“Thrombosis in the Retinal Vascular System.”

The author has examined a larger material of local circulatory affections of the retinal blood vessels and reports, with drawings, more extensively on four incident cases of marantic, mechanic and septic thrombosis.

WINTERSTEINER (Vienna)—“Nævus and Sarcoma of the Conjunctiva.”

A nævus is usually pigmented. The pigment lies in the epithelium, especially in the basal cells, but also in the superficial layers, in the connective tissue and free. Over the nævus the epithelium is often very thin, in other cases it sends solid pegs or hollow tubes into the depth; this may produce a resemblance to an adenoma (nævus glandulosus). These gland-like tubes may become enlarged like cysts, press the nævus cells aside and compress them. The cells lining these tubes may contain a colloid substance which later may be expelled and form concretions. Nævi are found about equally in all parts of the conjunctiva, sarcoma, however, resides with prevalence in the region of the palpebral fissure. This is due to the

frequent insults to which *nævi* in this part are naturally exposed. Thus they become malignant. Additional proof for this are a larger number of observations in which the tumor grew sooner or later after an injury, and such cases in which of a number of pigmented spots only those lying in the palpebral fissure took on a sarcomatous character.

BAAS (Freiburg)—“Scrofulous Ophthalmia.”

The author examined the eyes of a girl, dead from tuberculosis, who had repeatedly suffered from scrofulous eye affections. Besides old changes he found recent circumscribed nodules, which must be looked upon as *phlyctænulæ* in different stages of development. From these specimens the anatomical course of *phlyctænulæ* is the following: Arrosion of Bowman's membrane at its posterior surface; excavation of this membrane by a penetrating vascular inflammatory tissue which at first consists mainly of round cells. These enter the epithelial layers and gradually destroy and thin them. The resulting ulcer heals with a connective tissue scar. A *phlyctænule*, therefore, does not result from a primary ectogenous infection, but the abnormally constituted tissue answers to external insults by the formation of the characteristic changes.

ABERSDORFF (Berlin)—“On the Eyes of Malays, Mongols, and Negroes.”

Ophthalmometric measurements of the eyes of thirty-five Kirgises and ten Togo-negroes showed their corneal radius smaller than in the Caucasian race. When astigmatism was present the vertical meridian had the greater refraction. Fifty-seven and one half per cent. of the Kirgises and 30 per cent. of the Togo-negroes were free from astigmatism, yet the total number of eyes is too small to be of much value. In one negro only was vision reduced in consequence of astigmatism. With the exception of a highly civilized myopic (1 D.) Japanese woman, the eyes showed emmetropia or slight hypermetropia. Among thirty-three negroes two showed double contoured nerve fibers. Among the Japanese and negroes who have a much more pigmented skin and conjunctiva than the Kirgises, he found even in young individuals often a ring-shaped corneal opacity beginning at the upper limbus. Abersdorff considers this as an extraordinary encroachment of the sclerotic on the cornea, as in a milder degree it may be found in the Caucasian race.

GROENOUW (Breslau) — "Bacteriological Studies of the Etiology of the Conjunctival Inflammations in the Newly-Born."

Forty cases of conjunctival inflammations in children a few days old, typical blennorrhœa as well as simple catarrh. He found fourteen times gonococci, five times pneumococci, once staphylococcus pyogenes aureus, three times bacteria coli. The gonococci were usually accompanied by other bacteria. The pneumococci did not produce the picture of a blennorrhœa, but that of a mild or severe benign catarrh. Bacterium coli caused catarrh or mild blennorrhœa. One-third of the cases gave no typical bacteriological result. According to Groenouw, the clinical picture does not allow of any conclusions as to the kind of infection. To demonstrate the gonococcus a cover-glass specimen is sufficient (typical shape, situation within cells and discoloration by Gram).

The following papers remained unread on account of lack of time :

GREEF (Berlin)—Acute Retrobulbar Neuritis.

FRANKE (Hamburg)—Pemphigus and Essential Shrinking of the Conjunctiva.

SCHANZ (Dresden)—The So-Called Xerosis Bacillus.

LANDOLT (Paris)—Concerning Muscular Advancement.

WEISS (Mannheim)—Strabismus.

AXENFELD (Rostock)—Self-Inflicted Dislocation and Removal of Eyeball in aliens.

SCHOEN (Leipzig)—The Etiological Treatment of Glaucoma.

WINTERSTEINER (Vienna)—On Cysts and Concretions in the Conjunctiva.—[E. VON HIPPEL, *Zehender's Monatsblätter.*]

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

F. RICHARDSON CROSS, F.R.C.S., Vice-President, in the Chair.
THURSDAY, NOVEMBER 20, 1898.

Accommodation Theories.—MR. PRIESTLEY SMITH read a paper entitled "The Accommodation Theories of Helmholtz and Tscherning—Suggested Explanation of Their Discrepancy." He said Tscherning's theory was sharply opposed to the generally accepted explanation, but was based on very ac-

curate observation. The question was whether the accommodative change in the lens depended on slackening of the zonula (Helmholtz) or on tightening (Tscherning). The anatomical arrangement of the parts concerned, and nearly all clinical and experimental facts, especially the observations of Hess, which showed that during strong accommodation the lens was often tremulous and displaced downwards by gravity, strongly favored the former view. Tscherning, however, had proved that during accommodation the anterior lens surface changed from a globular to a hyperboloid curve—that is, tended to become conical—sharper at the center of the pupil, flatter towards the margin; and this, he contended, could only be caused by tightening of the zonula supplemented by internal resistance at the pole of the lens. The author's object was to show that this change could be equally well explained by slackening of the zonula. Let the case of an elastic circular hoop of steel first be taken. Traction at the sides transformed it into an ellipse; the curve flattened at the poles and sharpened at the equator, and somewhere intermediate between these regions was a point where no change took place. The position of this point and the general contour assumed by the hoop were governed by the varying resistance which it offered at different points. By modifying the resistance the curve could be modified at pleasure. Let the resistance at the pole be increased and the conical form observed by Tscherning was obtained; let it be increased towards the equator and the opposite effect—namely, a flattening at the pole and a sharpening of the curve elsewhere, was obtained. Mr. Priestley Smith exhibited a model consisting of an elastic hoop of metal bent so that it assumed, in exaggerated form, the shape of the lens during accommodation—namely, conicity of the anterior surface. It was strengthened with supplementary elastic strips in such a way that its resistance or rigidity increased progressively from the pole towards the equator. Traction at the equator, representing tightening of the zonula, reduced the conical to a spherical form. In the latter condition it represented the lens when subjected to the influence of the zonula; in the conical state it represented the accommodative change which occurred when the zonula was slackened by contraction of the ciliary muscle. It would be easy to theorize as to the resistance proper to the crystalline lens, and to show reason for suppos-

ing that the arrangement of the fibers was such as to render the resistance progressively greater towards the equator, but Mr. Priestley Smith said he would not go beyond demonstrable facts. What he desired to show was that the changes which Tscherning had demonstrated with such admirable skill and ingenuity were not incompatible with the theory of Helmholtz. To his mind they were explained more satisfactorily by this theory than by any other.

MESSRS. CROSS, LANG, ERNEST CLARKE, BASS, DOYNE, and HARTRIDGE made remarks.

Myxo-Fibroma of the Optic Nerve Sheath.—MR. ARNOLD LAWSON reported a case. The patient was a well-nourished girl, aged 2 years. The sight of the left eye had been thought defective three months; it had been getting prominent a few weeks. The personal health and family history were both good; the left eye was slightly prominent, but its movements were good, and the pupil acted to light; the fundus was normal except that the veins were rather full. Five weeks later there was decided proptosis, the pupil was inactive, the optic nerve pale, and the eye was blind; the movements, however, were good. From this time the symptoms progressed rapidly till the time of operation, five months after the first visit; the disc was then chalky white, the eye was proptosed forwards and slightly downwards, and the movements were strictly limited. The eye and contents of the orbit were removed; the tumor, which was as large as a partridge's egg, nearly filled the orbit, and completely surrounded the optic nerve from the lamina cribrosa to the optic foramen. The child was now, six months after operation, in good health. The optic nerve was not involved in the tumor, which arose from the outer dural sheath. Microscopically the growth was found to be a myxofibroma. Mr. Lawson thought it inadvisable to attempt to save the eye in these cases; if the growth extended to the optic foramen, this latter should be scraped out. Myxo-fibromata were very rare; as a possible origin he suggested that a portion of the mesoderm intended to form the vitreous became included in the sheath of the optic nerve during its closure.

Toxic Amblyopia Due to Lead.—DR. HERBERT H. FOLKER (Stoke-on-Trent) reported five cases which occurred among employees in the pottery district:

1. F., aged 26 years, had worked in the dipping house two years; on four occasions she had had symptoms of lead poisoning, colic, vomiting, and headache. Vision failed in the left eye, and four days later in the right; the failure began with flashes of light and colored vision, and rapidly proceeded to total blindness. The pupils were dilated and inactive, the optic discs pale and blurred, the retina œdematous, and there were several hæmorrhages in it. There was some albumen in the urine.

2. F., aged 20 years. Six weeks after beginning work as a lithographer she had headache and colic; after a year she had sudden total loss of color vision, followed by sensations of light flashes. There was typical neuro-retinitis, with hæmorrhages. In this case vision improved.

3. M., aged 16 years. Employed in the dipping house. After two years he had diplopia with headache, colic, and vomiting; the vision failed shortly after, and in six weeks he was totally blind. He also had colored vision for a time and flashes of light. The optic discs were very white and the arteries reduced to white cords. He had a trace of albumen and a gum line.

4. F., aged 18 years. Employed in the dipping house. After three years she had headache and vomiting; the vision failed in one night; she had flashes of light of various colors. The optic discs were intensely white.

5. F., aged 18 years. Employed in the dipping house. For ten months she had several attacks of headache, colic, and vomiting; then the sight failed, and in two months she was blind. The optic discs were white and the vessels small.

In this series of cases all other toxic agents were excluded. All the patients who had worked in the dipping houses did not respond to treatment, the other single case did; in the former the poison was introduced by absorption through the skin, in the latter by inhalation. With one exception all the cases experienced colored vision. Treatment was by iodides of potassium or strychnine by the mouth or hypodermically.

Card Specimens.—Major M. T. YARR, R. A. M. C., Case with Fundus Changes and Fibrous Tissue Formation in Vitreous, (?) Congenital. Mr. TREACHER COLLINS, Case of Monilethrix Affecting Eyelashes and Eyebrows. Mr. DOYNE, Case of Pigmentation of the Conjunctiva.

WESTERN OPHTHALMOLOGICAL AND OTOLARYNGOLOGICAL ASSOCIATION.

PRELIMINARY PROGRAM.

The fourth annual meeting of the Western Ophthalmological and Oto-Laryngological Association will be held in New Orleans, February 10 and 11, 1899.

CASEY WOOD, Chicago—Title later.

W. A. FISHER, Chicago—Title later.

W. L. BALLINGER, Chicago—Title later.

J. ELLIS JENNINGS, St. Louis—Title later.

E. C. ELLETT, Memphis, Tenn.—Title later.

W. H. BAKER, Lynchburg, Va.—Retinoscopy.

A. ALT, St. Louis—The Pathology of Cataract.

J. R. ROBERTSON, Colorado Springs—Title later.

HAL FOSTER, Kansas City, Mo.—Congenital Nasal Atresia.

S. S. LEDBETTER, Birmingham, Ala.—Keratitis Herpetica.

H. H. BROWN, Chicago—The Etiology and Importance of Iritis.

W. E. DRIVER, Norfolk, Va.—Best Vision After Cataract Extraction.

E. E. HAMILTON, Wichita, Kans.—Refraction of Trachomatous Eyes.

W. T. GROVES, Eureka, Kans.—Tuberculosis of Tonsils, Pharynx and Larynx.

ELLET O. SISSON, Keokuk, Iowa—Injuries of the Eyeball, with Report of Cases.

J. J. KYLE, Marion, Ind.—An Ophthalmologist's Experience with the Army.

G. A. WALL, Albuquerque, N. M.—Retinal Detachment, Loss of Vision, Recovery.

H. V. WUERDEMANN, Milwaukee—A Report on Operative Treatment of High Myopia.

N. H. PIERCE, Chicago—Indications for Operative Interference in Chronic Suppurative Otitis.

CASSIUS D. WESOTT, Chicago—Some Experiences With Dr. Gould's Method of Prismatic Exercises.

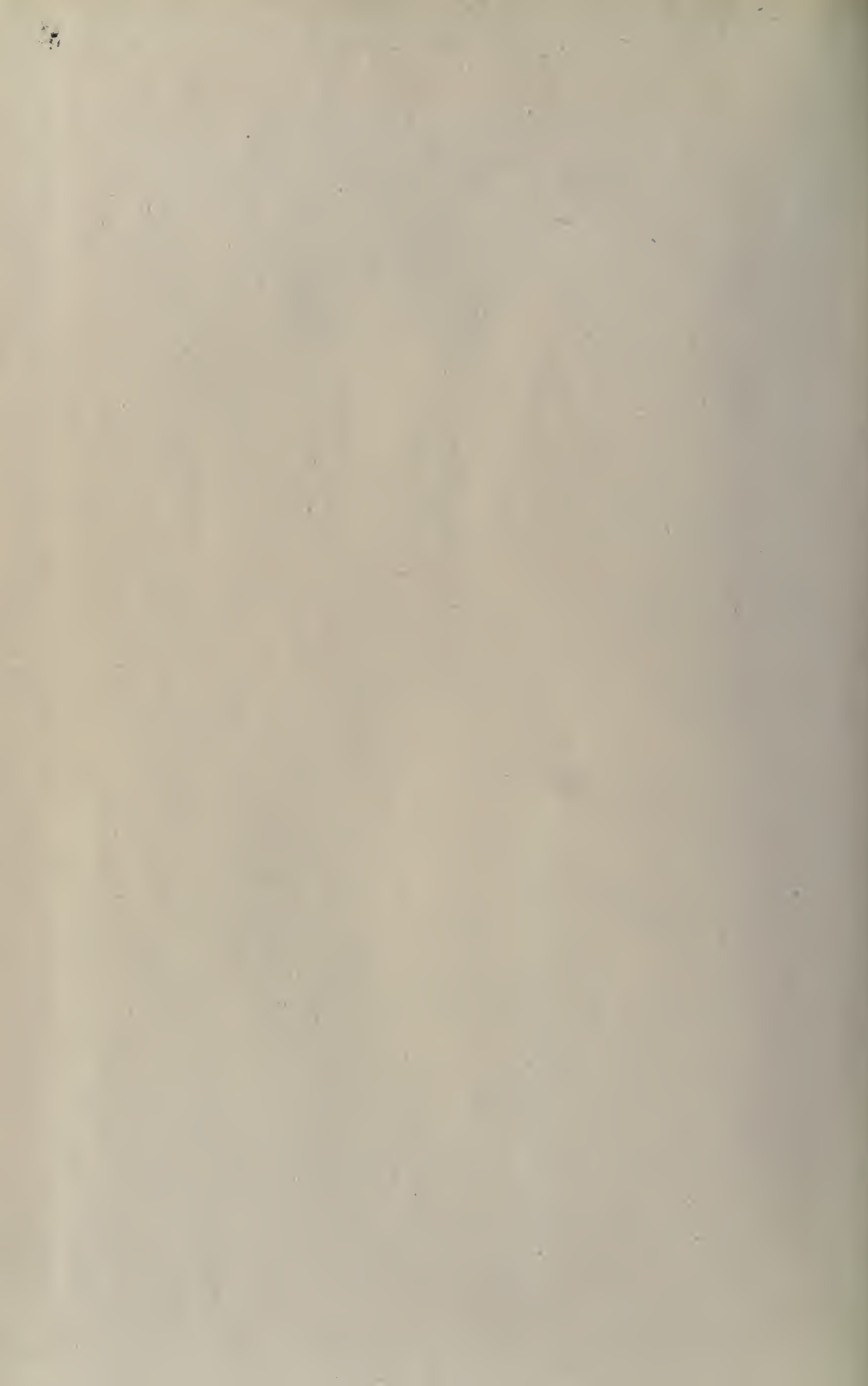
L. R. CULBERTSON, Zanesville, Ohio—Case of Bell's Palsy and Epilepsy Cured by Correction of Ametropia and Heterophoria.

GEORGE F. KEIPER, Lafayette, Ind.—Treatment of Diseases of the Lachrymal Duct by Cataphoresis with Exhibition of Cupped Sounds.

D. MILTON GREENE, Grand Rapids, Mich.—Fifty Mastoid Operations, Including Four Brain Abscesses and One Perforation of the Sigmoid Sinus.

JAMES M. BALL, St. Louis—Large Tumor of the Brain Encroaching on the Motor Area and Causing Few Symptoms Save Optic Neuritis, With Remarks on the Value of Double Neuritis as a Sign of Brain Tumor.





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